

Find-It-In-Front: Dr. Pinball Section

The inside cover & the front pages
DR. ① thru DR. ⑩ covers the basics

A lot of questions get answered here...



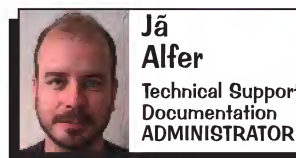
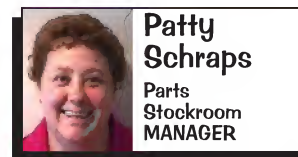
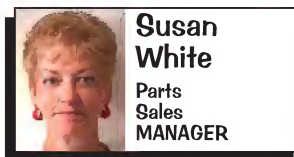
The Portals™ Service Menu,
Section 3, is your Technical Friend...



<http://www.SternPinball.com>
2020 Janice Ave., Melrose Park, IL 60160



Your Parts Sales & Technical Support Team



Please call us at 1-800-542-5377 or
1-708-345-7700 for Technical Support.
Visit us at our Web Site www.SternPinball.com.

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SPI PN^o:
780-5076-00

FOR PROPER OPERATION OF PLAYBOY PINBALL,
FOUR (4) PINBALLS MUST BE INSTALLED!

**STERN
PINBALL, INC.**

This Game is equipped with 3 Sets of Photo Inserts (1 installed on the game).

Find the "Additional Photo Inserts" Kit (SPI Part Number: 502-5010-00)

with the spare Photo Inserts, Instructions, and other Important Information!

Please Read All Cautions in this manual to prevent injury and/or damage to parts.

PLAYBOY PINBALL ADDITIONAL PHOTO INSERTS REPLACEMENT INSTRUCTION SHEET

Your Pinball Game comes with 3 Photo Insert Sets: 1 Set has already been installed in your game, and the other 2 Sets are contained in the Kit Bags. Choose the Photo Inserts Set to suit your needs or mix-n-match as you please!

CAUTION! To change the Photo Inserts in the Centerfold Mechanism, use the Centerfold Motor Test in the Diagnostics Menu (see opposite page for more info on Portals). **DO NOT FORCE THE CENTERFOLD MECHANISM OPEN WITH YOUR HANDS! THIS WILL CAUSE DAMAGE TO THE MOTOR AND UNIT.**

Noted by "A"

Noted by "B"

Noted by "C"

NO NUDITY

**NUDITY
FACTORY SUGGESTED**

**SOME FULL
NUDITY**

Put the Playfield forward and rest the photo inserts on the front of the cabinet to keep steady. Put the Photo Insert Set inside the top of the cabinet with another.

Please note the Caution above! Before Diagnostics, Playfield Test, Centerfold Motor Test (see opposite page for details on settings), or other service you should insert inside the P4 to the Photo Insert Set (see opposite page for details on settings). Please ensure the P4 is in the correct position (see opposite page for details on settings).

Put the Playfield forward and rest the photo inserts on the front of the cabinet to keep steady. Put the Photo Insert Set inside the top of the cabinet with another.

**TEASE
SCREEN**

CENTERFOLD MECHANISM

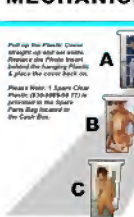
**MIRROR
PANEL**



**CENTERFOLD
MECHANISM**

**TRIANGLE
BILLBOARD**

MAGAZINE



BEAD CURTAIN

MAGAZINE

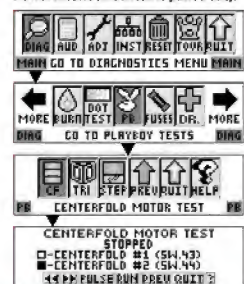
MAGAZINE

READ CAUTION! WHEN REPLACING THE PHOTO INSERTS IN THE CENTERFOLD! DO NOT USE HANDS TO PRY OPEN!

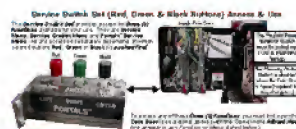
Before changing
Photo Inserts,
read Caution!



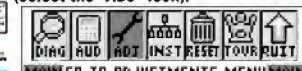
CAUTION: When changing the Photo Inserts in the Centerfold Mechanism (see inside page), **DO NOT FORCE OPEN BY HAND**, use the Centerfold Motor Test via Portals! Select the RUN icon (ensure the Power Interlock Switch is pulled out).



PLAYBOY PINBALL CONTAINS ADULT CONTENT



To turn OFF the Adult Content, enter the Portals Menu Service System (see Function 3). Go to Adjustments Menu (select the "ADJ" icon).



Go to Feature Adjustments Menu (select the "PB" icon).



Select either of the **NO** icons until Adjustment 61 appears. Select either of the **NO** icons until "NO" is displayed. Select the **NO** icon.

Note: After any Factory Reset, you must enter the Portals™ Service Menu and rechange this adjustment back to "NO".

Read your Game Manual for more detailed information!



New to Portals! The **INSTALLS MENU!**

Read over Section 3, Chapter 5, Pages 47-50.



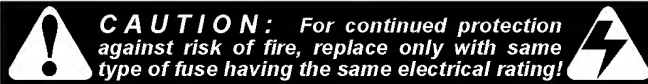
Customize your game with ease WITHOUT having to go through many Adjustments....
You can now **FACTORY RESET** all Adjustments **WITHOUT** affecting the AUDITS!



New to our Pinball Games?

Don't forget to go over **Section 3, Chapter 1, Portals™ Service Menu Introduction**. If using Diagnostics...very useful! Got confused? Comments? Questions? Call Technical Support at 800-542-5377 or 708-345-7700 (Option 1).

▼ BACKBOX LAYOUT LOCATIONS: Fuses, Bridges, Relays & ROMs ▼



QUICK REFERENCE FUSE CHART

Backbox Fuses

LOC: DISPLAY POWER SUPPLY (P.S.) BOARD

F1 3/4A 250v S.B. 90v DC High Voltage Display

LOC: I / O POWER DRIVER BOARD

F6	7A 250v S.B.	50v DC	Primary High Power Coils/Flippers
F7	5A 250v S.B.	20v DC	Low Power Coils
F8	5A 250v S.B.	12v DC	Logic Power
F9	5A 250v S.B.	12v DC	Logic Power
F20	3A 250v S.B.	50v DC	Magnet
F21	3A 250v S.B.	50v DC	Coils
F22	8A 250v S.B.	18v DC	Controlled Lamps
F23	4A 250v S.B.	5v DC	Logic
F24	5A 250v S.B.	6.3v AC	G.I. Lamps (BRN-WHT to WHT-BRN)
F25	5A 250v S.B.	6.3v AC	G.I. Lamps (YEL to WHT-YEL)
F26	5A 250v S.B.	6.3v AC	G.I. Lamps (GRN to WHT-GRN)
F27	5A 250v S.B.	6.3v AC	G.I. Lamps (VIO to WHT-VIO)
F28	3A 250v S.B.	24v AC	Not Used / Spare

Cabinet Fuses

LOC: SERVICE (AC) OUTLET BOX (Cabinet Bottom)

n/a 8A 250v S.B. 115v AC Main Fuse Line (Domestic or USA)

n/a 5A 250v S.B. 220v AC Main Fuse Line (International)

Playfield Fuses

LOC: UNDER PLAYFIELD (near Flippers)

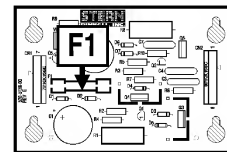
n/a	3A 250v S.B.	50v DC	Rt. Flipper (BLU-YEL↔RED-YEL)
n/a	3A 250v S.B.	50v DC	Lt. Flipper (GRY-YEL↔RED-YEL)
n/a	3A 250v S.B.	50v DC	Upr. Flipper (GRY-YEL↔RED-YEL)

For locations & more information on fuses, see Sec. 5, Chp. 2.

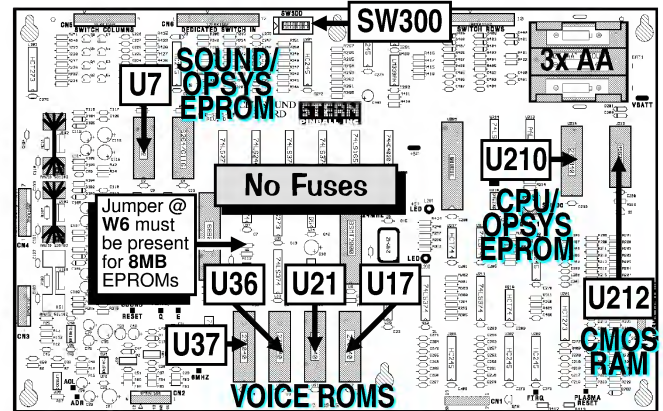
For Backbox & Cabinet General Parts, review Section 4, Chapter 1, Parts Identification & Location (The Pink Pages).

For Schematics and/or Component Parts on PC Boards shown, review Section 5, Chapter 4, Printed Circuit Boards (The Yellow Pages).

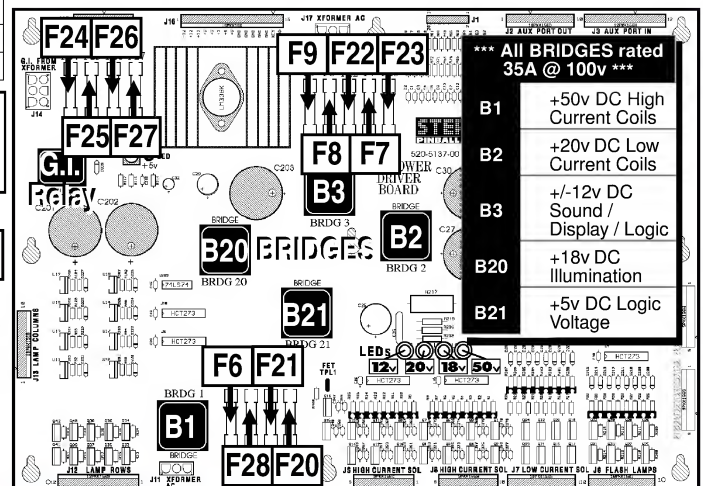
Display Power Supply Board



CPU / Sound Board

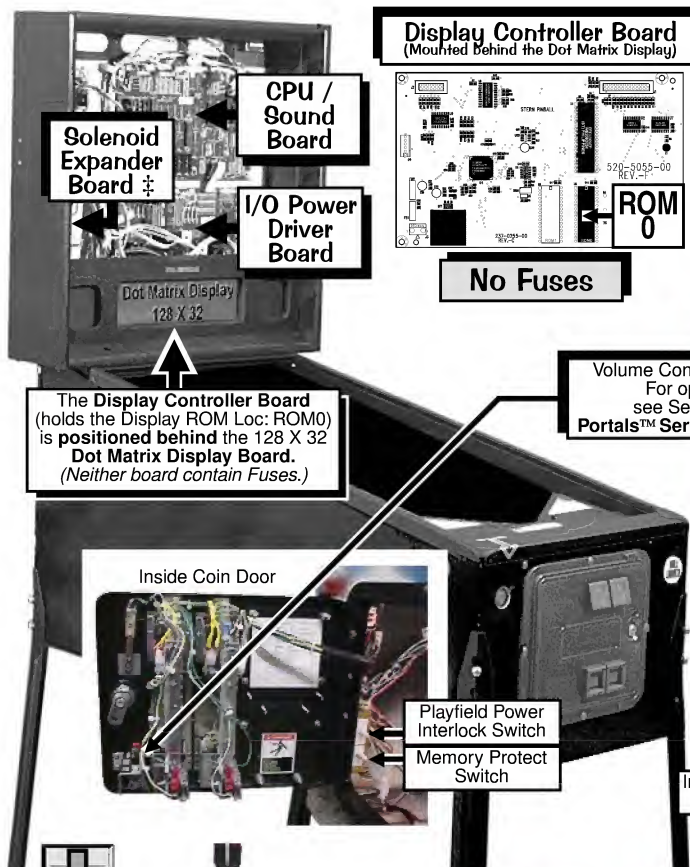


I/O Power Driver Board



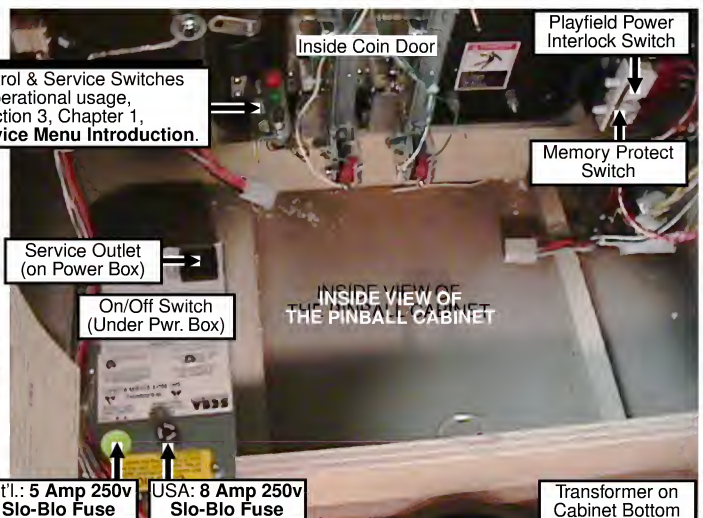
*** All BRIDGES rated 35A @ 100v ***

B1	+50v DC High Current Coils
B2	+20v DC Low Current Coils
B3	+/-12v DC Sound / Display / Logic
B20	+18v DC Illumination
B21	+5v DC Logic Voltage



The Display Controller Board (holds the Display ROM Loc: ROM0) is positioned behind the 128 X 32 Dot Matrix Display Board. (Neither board contain Fuses.)

Volume Control & Service Switches For operational usage, see Section 3, Chapter 1, Portals™ Service Menu Introduction.



Find-It-In-Front:
Dr. Pinball

PLAYBOY

////// FIND-IT-IN-FRONT: Dr. Pinball Section Explained //////////

The key technical data from various parts of the manual were extracted and combined into the "Find-It-In-Front: Dr. Pinball Section." This section (pages DR. ❶ - ❷) will assist the technician in locating important technical information needed to troubleshoot the Pinball Machine. Dr. Pinball is also available in a Flow Chart Help Format in the Game Display. To access, enter the **Portals™ Service Menu**.

////// How It Works //////////

First, the operator / technician must enter the **Service Menu Mode** (for a complete description of the **Portals™ Service Menu** and **ICONS Read!** Section 3, Chapter 1). To get into the **Service Menu Mode**, power-up the game (if not already) and open the **Coin Door**. On the **Coin Door** is the **Portals™ Service Switch Set** (Red, Green & Black Buttons).

Step 1: Push down the **Black "BEGIN TEST" Button**. Looking at the Video Display you will momentarily see the introductory screen followed by the **MAIN MENU**.

Step 2: Move through the Menus by pushing the **Red "LEFT"** or **Green "RIGHT"** Buttons.

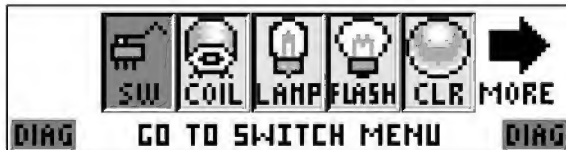


Step 3: Select or activate the *Icons* by pushing the **Black "ENTER" Button**.

While in the **Portals™ Service Menu**, the **Start Button** can be used in lieu of the **Black Button**; the **Left & Right Flipper Buttons** can be used in lieu of the **Red & Green Buttons**. However, in **Switch** or **Active Switch Tests** *only* the **Red & Green Buttons** can be used.

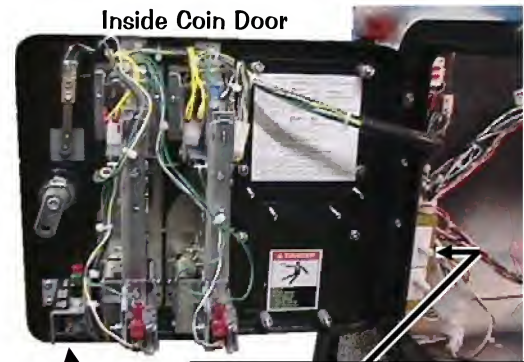


In our **Portals™ Service Menu**, selecting the "DR." *Icon* will bring the operator/technician into **DR. PINBALL (Flow Chart Menus)**, the "on-screen" diagnostic aide. This is a feature that will allow you to utilize the power of the micro-processor assisting in troubleshooting a problem with the machine in a **Flow Chart** format (*follow the questions & answer by using the Mini-Icons in the display*).



Press the **Black "ENTER" Button** to *activate* this **ICON**. The **DR. PINBALL MENU (Flow Chart Menus)** now appears with the **COIL "DR." Icon** flashing. Three (3) *Icons*, Coil "DR.", Switch "DR." and Lamp "DR." are available for selection. Selecting a particular *Icon* will give you a choice of which specific **Coil** (*any and all coil assemblies such as Flippers, VUKs, Magnets, etc.*), **Switch** or **Lamp Circuit** needs to be diagnosed. After selection, *Dr. Pinball* will now display a question or a procedure to follow such as "Does the lamp turn on?" or "Check bridge rectifier BR-20, if short replace." When *Dr. Pinball* displays a question or requests a procedure, *Dr. Pinball* will expect a response such as "NO" or "YES". You the operator/technician must respond by using the **Red** or **Green Buttons** to "SELECT" a *Mini-Icon* and the **Black Button** to "ACTIVATE or ENTER" your selection.

For *Mini-Icons* explanations & details, see the end of Section 3, Chapter 2, **GO TO DIAGNOSTICS MENU, Dr. Pinball**.



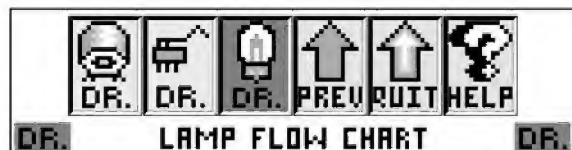
Inside Coin Door

If Coil & Flashlamp Testing, the Playfield Power Interlock Switch must be pulled out.

Portals™ Service Switch Set



After entering **Portals™**, the **MAIN MENU** now appears with the "DIAG" *Icon* (GO TO DIAGNOSTICS MENU) flashing; press the **Black "ENTER" Button** to *activate* this **ICON**. The **DIAGNOSTICS MENU** now appears with the "SW" *Icon* (GO TO SWITCH MENU) flashing; use the **Red "LEFT"** or **Green "RIGHT"** Buttons, until the "DR." *Icon* (DR. PINBALL) is flashing:



DIAGNOSTIC AIDS

OPEN THE DOOR

Check battery voltage at VBATT Test Point on the CPU/Sound Bd. (more details in Sec. 5, Chp. 4, PCBs).

OPERATOR ALERT! #2 AUTO LAUNCH COIL MALFUNCTION

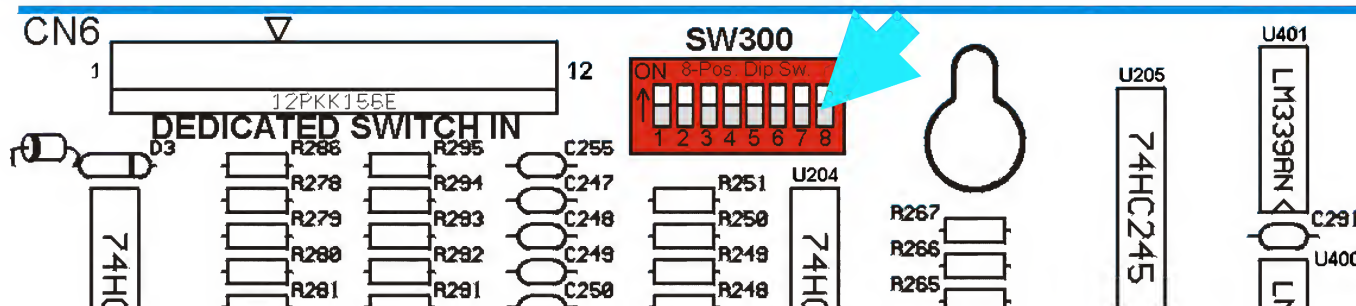
This **display** is shown momentarily during **Game Mode** or **Power-Up** to alert the operator of a coil malfunction (*coil doesn't energize or coil fires a multiple number of times*). **OPERATOR ALERT!** works by monitoring any switch activated coil that has the potential to trap a ball when disabled (e.g. in the Auto Launch, Scoop, Eject, etc.). This alert can also appear if a switch associated with a coil (e.g. #16 Shooter Lane & #2 Auto Launch) is stuck closed (caused by a switch jam or stuck ball); the CPU/Sound Board will activate the coil approximately ten times and if the switch remains closed, the game will report this switch in **Technician Alerts** & will indicate the following display warning:

PLEASE CHECK TECH REPORT PORTALS->DIAG->TECH

If this **display flashes** (along with an audible sound), the game has detected faulty switches and/or missing pinballs. To check, enter the **Portals™ Service Menu System**, select the "DIAG" Icon (GO TO DIAGNOSTICS MENU) from the MAIN MENU and select the "TECH" Icon (more details in Sec. 3, Chp. 2, GO TO DIAGNOSTICS MENU).

CPU DIP SWITCH SETTINGS

Location of Dip Switch [SW300] is on the CPU/Sound Board (Right of CN6, Top Middle)

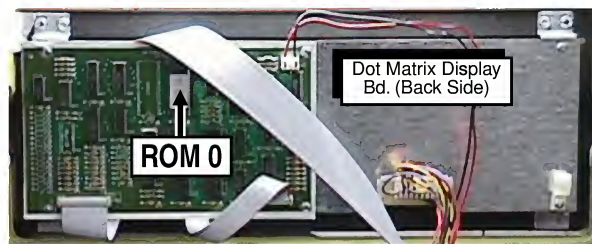


CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Austria	ON	▲	▼	▼	▼	▼	▼	▼	▼
	OFF	▼	▲	▲	▲	▲	▲	▲	▲
Australia	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
Belgium	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
Canada	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
Denmark	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
Finland	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
USA	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
France	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
Germany	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
Greece	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
Italy	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
Netherlands	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
New Zealand	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
Norway	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
Portugal	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
Spain	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
Sweden	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
Switzerland	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼
UK	ON	▲	▲	▲	▲	▲	▲	▲	▲
	OFF	▼	▼	▼	▼	▼	▼	▼	▼

ROM SUMMARY TABLE



The Display Controller Board (holds the Display ROM Loc: ROM0) is positioned behind the 128 X 32 Dot Matrix Display Board.

I.C. NAME	TYPE	BD. NAME	LOC.	PART N°
Game ROM	1MB	CPU / Sound Bd.	U210	965-0367-76
Sound EPROM	512K	CPU / Sound Bd.	U7	965-0368-76
Display EPROM	4MB	Display Cntrl. Bd.	ROM 0	965-0369-76
Display EPROM	N/C	Display Cntrl. Bd.	ROM 1	N/A
Voice ROM 1	8MB	CPU / Sound Bd.	U17	965-0370-76
Voice ROM 2	8MB	CPU / Sound Bd.	U21	965-0371-76
Voice ROM 3	8MB	CPU / Sound Bd.	U36	965-0372-76
Voice ROM 4	8MB	CPU / Sound Bd.	U37	965-0373-76

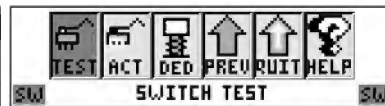
For Game, Sound & Voice ROM Locations see DR. ①.



Find-It-In-Front:
Dr. Pinball

PLAYBOY

DR. ③



In SWITCH MENU
also select:

ACTIVE and
DEDICATED
SWITCH TESTS

SWITCH MATRIX GRID & DEDICATED SWITCHES

D iode O n T ermi n a l S tri p :								
Column (Drive)	1: Q1	2: Q2	3: Q3	4: Q4	5: Q5	6: Q6	7: Q7	8: Q8
Row (Return)	GRN-BRN CN5-P1	GRN-RED CN5-P3	GRN-ORG CN5-P4	GRN-YEL CN5-P5	GRN-BLK CN5-P6	GRN-BLU CN5-P7	GRN-VIO CN5-P8	GRN-GRY CN5-P9
1: U400	LEFT BUTTON (UK ONLY) on Cabinet side	SKILL SHOT Under Playfield	RIGHT RAMP ENTER On Ramp Assy.	POP BUMPER EXIT Under Playfield	SURPRISE PACKAGE TARGET On Assembly	LEFT RAMP ENTER On Ramp Assy.	LEFT BUMPER On Assembly	LEFT OUTLANE Under Playfield
2: U400	4TH COIN SLOT On Coin Door	RIGHT ORBIT Under Playfield	RIGHT RAMP EXIT On Ramp Assy.	DROP TARGET On Assembly	GROTTO EJECT Under Playfield	LEFT RAMP EXIT On Ramp Assy.	RIGHT BUMPER On Assembly	LEFT RETURN LANE Under Playfield
3: U400	6TH COIN SLOT On Coin Door	4-BALL TROUGH #1 (LEFT) On Assembly	CENTER LANE Under Playfield	LEFT ORBIT Under Playfield	VUK On Assembly	CENTERFOLD 1 (CLOSED) On Assembly	BOTTOM BUMPER On Assembly	LEFT SLINGSHOT On Assembly
4: U400	RIGHT COIN SLOT On Coin Door	4-BALL TROUGH #2 On Assembly	NOT USED	NOT USED	NOT USED	CENTERFOLD 2 (OPEN) On Assembly	TEASE SCREW LIMIT On Assembly	RIGHT OUTLANE Under Playfield
5: U401	CENTER COIN SLOT / DBA On Coin Door	4-BALL TROUGH #3 On Assembly	CENTER RAMP EXIT On Ramp Assy.	TRIANGLE MECH 1 (RIGHT) On Assembly	NOT USED	NOT USED	TOURNAMENT BUTTON Cabinet Front	RIGHT RETURN LANE Under Playfield
6: U401	LEFT COIN SLOT On Coin Door	4-BALL TROUGH VUK OPTO On Assembly	LEFT TOP LANE Under Playfield	TRIANGLE MECH 2 (LEFT) On Assembly	RAMP BALL LOCK 3 On Ramp Assy.	NOT USED	START BUTTON Cabinet Front	RIGHT SLINGSHOT On Assembly
7: U401	5TH COIN SLOT On Coin Door	4-BALL STACKING OPTO On Assembly	MIDDLE TOP LANE Under Playfield	NOT USED	RAMP BALL LOCK 1 On Ramp Assy.	NOT USED	NOT USED	NOT USED
8: U401	RIGHT BUTTON (UK ONLY) on Cabinet side	SHOOTER LANE Under Playfield	RIGHT TOP LANE Under Playfield	PEEK-A-BOO TARGET On Assembly	RAMP BALL LOCK 2 On Ramp Assy.	NOT USED	PLUMB BOB TILT Inside Cabinet	NOT USED



In LAMP MENU
also select:

TEST ALL LAMPS,
ROW & COLUMN
LAMP TESTS

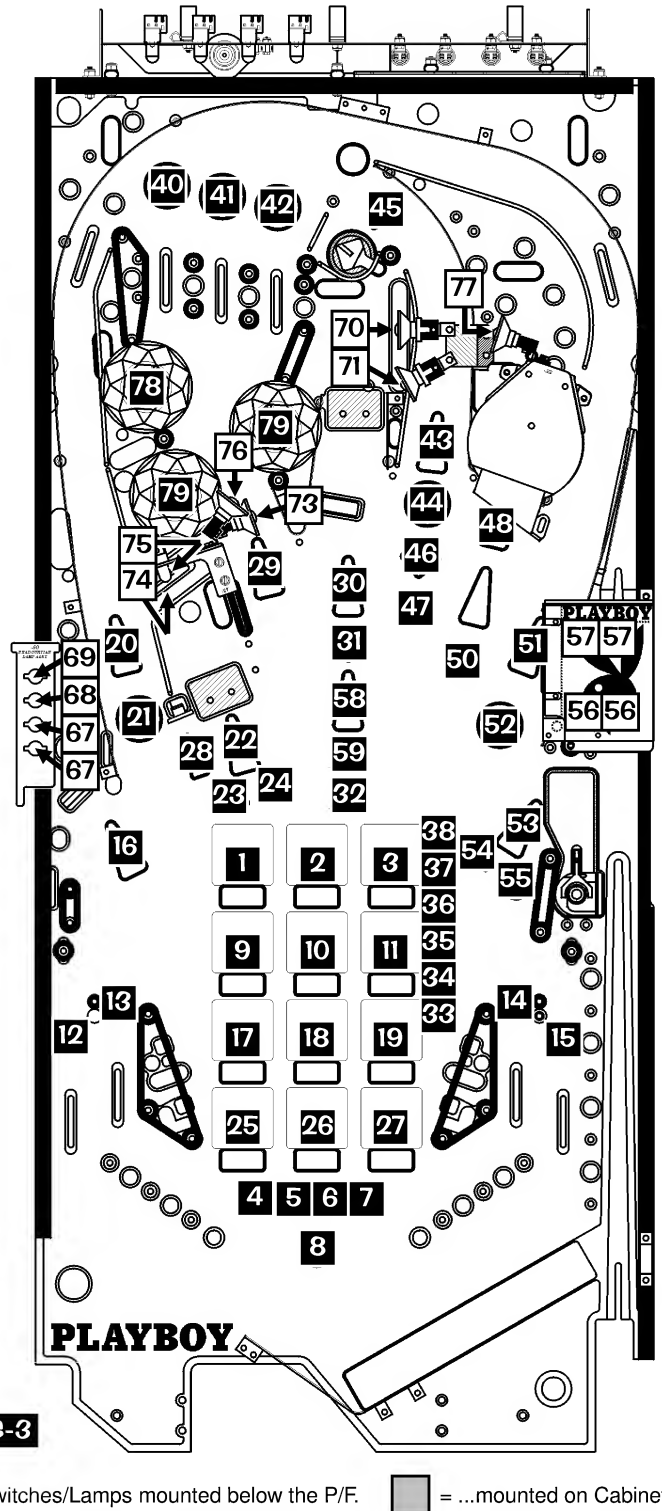
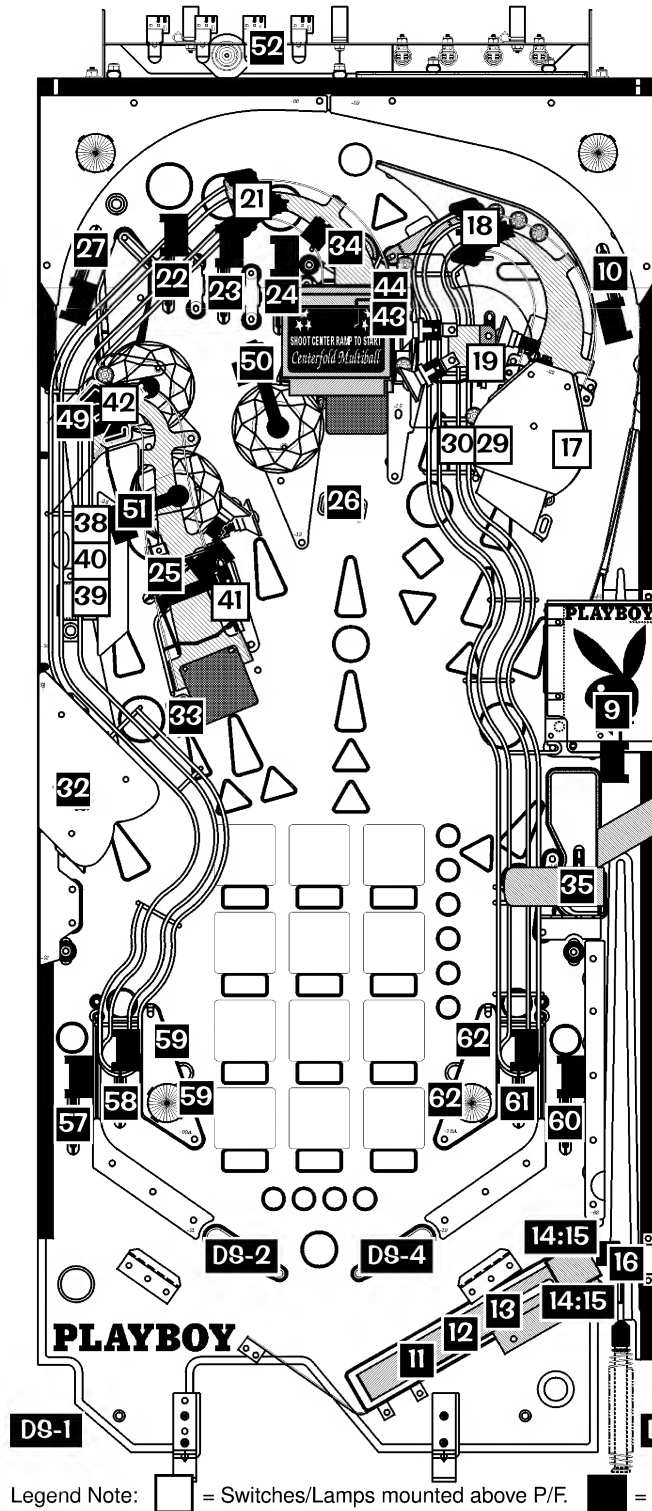
LAMP MATRIX GRID

D iode O n T ermi n a l S tri p :								
Column (18v)	1: UI7	2: UI6	3: UI5	4: UI4	5: UI3	6: UI2	7: UI1	8: UI0
Row (GND)	YEL-BRN J13-P9	YEL-RED J13-P8	YEL-ORG J13-P7	YEL-BLK J13-P6	YEL-GRN J13-P5	YEL-BLU J13-P4	YEL-VIO J13-P3	YEL-GRY J13-P1
1: Q33	JANUARY #555 Bulb	FEBRUARY #555 Bulb	MARCH #555 Bulb	MANSION 1 (LT) #555 Bulb	MANSION 2 #555 Bulb	MANSION 3 #555 Bulb	MANSION 4 (RT) #44 Bulb	SHOOT AGAIN #555 Bulb
2: Q34	APRIL #555 Bulb	MAY #555 Bulb	JUNE #555 Bulb	LEFT OUTLANE #555 Bulb	LEFT RETURN LANE #555 Bulb	RIGHT RETURN LANE #555 Bulb	RIGHT OUTLANE #555 Bulb	PEEK-A-BOO #555 Bulb
3: Q35	JULY #555 Bulb	AUGUST #555 Bulb	SEPTEMBER #555 Bulb	PHOTO SHOOT (LT ORBIT) #555 Bulb	BUNNY (LT ORBIT) #555 Bulb	PHOTO SHOOT (LT RAMP) #555 Bulb	SPLASH (LT RAMP) #555 Bulb	JACKPOT (LT RAMP) #555 Bulb
4: Q36	OCTOBER #555 Bulb	NOVEMBER #555 Bulb	DECEMBER #555 Bulb	SURPRISE PACKAGE #555 Bulb	TEASE #555 Bulb	DROP TARGET #555 Bulb	MULTIBALL #555 Bulb	PAJAMA PARTY MULTIBALL #555 Bulb
5: Q37	BUNNY #1 (BOTTOM) #555 Bulb	BUNNY #2 #555 Bulb	BUNNY #3 #555 Bulb	BUNNY #4 #555 Bulb	BUNNY #5 #555 Bulb	BUNNY #10 #555 Bulb	NOT USED	LEFT TOP LANE #555 Bulb
6: Q38	MIDDLE TOP LANE #555 Bulb	RIGHT TOP LANE #555 Bulb	PHOTO SHOOT (CENTER) #555 Bulb	EXTRA BALL #555 Bulb	GROTTO ARROW #555 Bulb	PAJAMA PARTY HURRY-UP #555 Bulb	MYSTERY #555 Bulb	PHOTO SHOOT (RT RAMP) #555 Bulb
7: Q39	NOT USED	SPLASH (RT RAMP) #555 Bulb	PHOTO SHOOT (RT ORBIT) #555 Bulb	BUNNY (RT ORBIT) #555 Bulb	PHOTO SHOOT (VUK) #555 Bulb	JACKPOT HURRY-UP #555 Bulb	SPECIAL #555 Bulb	MAGAZINE 1 & 2 #555 Bulb
8: Q40	MAGAZINE 3 & 4 #555 Bulb	DOUBLE JACKPOT #555 Bulb	JACKPOT #555 Bulb	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
9: Q41	NOT USED	NOT USED	PEEK-A-BOO 1 & 2 #555 Bulb	PEEK-A-BOO 3 #555 Bulb	PEEK-A-BOO 4 #555 Bulb	CTRFOLD SPOTLITE (RT #1) #555 Bulb	CTRFOLD SPOTLITE (RT #2) #555 Bulb	START BUTTON #555 Bulb
10: Q42	CTRFOLD SPOTLITE (LT #2) #555 Bulb	STRIP POKER (LT RAMP) #555 Bulb	COLLECT PLAY-MATES #555 Bulb	CTRFOLD SPOTLITE (LT #1) #555 Bulb	CTRFOLD SPOTLITE (RT #3) #555 Bulb	LEFT BUMPER #555 Bulb	RIGHT & BOTTOM BUMPERS #555 Bulb	TOURNAMENT BUTTON #555 Bulb



SWITCH MATRIX GRID LOCATIONS

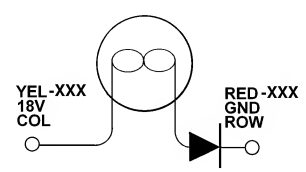
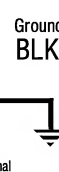
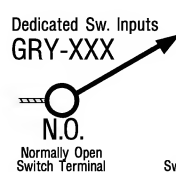
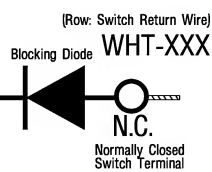
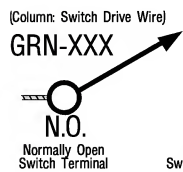
LAMP MATRIX GRID LOCATIONS



TYPICAL SWITCH SCHEMATIC

DEDICATED SWITCH SCHEMATIC

TYPICAL LAMP SCHEMATIC



Note: All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies. D iode Q n I terminal S trip or D iode Q n D iode B oard



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PLAYBOY

DR. 6



In COIL MENU
also select:

CYCLING
COIL
TEST

COILS DETAILED CHART TABLE

High Current Coils Group 1		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn or Bulb Type
#1	TROUGH UP-KICKER	Q1	I/O Pwr. Drvr.	BRN-BLK	J8-P1	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#2	AUTO LAUNCH	Q2	I/O Pwr. Drvr.	BRN-RED	J8-P3	YEL-VIO	J10-P4/5	50v DC	23-700 090-5022-00T
#3	BALL LOCK POST	Q3	I/O Pwr. Drvr.	BRN-ORG	J8-P4	BRN	J7-P1	20v DC	27-1500 090-5004-00T
#4	LEFT ORBIT POST	Q4	I/O Pwr. Drvr.	BRN-YEL	J8-P5	BRN	J7-P1	20v DC	26-1200 090-5044-00T
#5	DROP TARGET	Q5	I/O Pwr. Drvr.	BRN-GRN	J8-P6	YEL-VIO	J10-P4/5	50v DC	27-1500 090-5004-00B
#6	CENTER LANE POST	Q6	I/O Pwr. Drvr.	BRN-BLU	J8-P7	BRN	J7-P1	20v DC	26-1200 090-5044-00T
#7	BEAD SCREEN LEFT	Q7	I/O Pwr. Drvr.	BRN-VIO	J8-P8	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#8	BEAD SCREEN RIGHT	Q8	I/O Pwr. Drvr.	BRN-GRY	J8-P9	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T

High Current Coils Group 2		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn
#9	LEFT BUMPER	Q9	I/O Pwr. Drvr.	BLU-BRN	J9-P1	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#10	RIGHT BUMPER	Q10	I/O Pwr. Drvr.	BLU-RED	J9-P2	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#11	BOTTOM BUMPER	Q11	I/O Pwr. Drvr.	BLU-ORG	J9-P4	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#12	GROTTO EJECT	Q12	I/O Pwr. Drvr.	BLU-YEL	J9-P5	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#13	VUK	Q13	I/O Pwr. Drvr.	BLU-GRN	J9-P6	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#14	MAGAZINE POST	Q14	I/O Pwr. Drvr.	BLU-BLK	J9-P7	BRN	J7-P1	20v DC	24-940 090-5036-00B
#15	LEFT FLIPPER (50v RED/YEL)	Q15	I/O Pwr. Drvr.	ORG-GRY	J9-P8	RED-YEL GRY-YEL	J10-P1/2	50v DC	23-1100 090-5030-00T
#16	RIGHT FLIPPER (50v RED/YEL)	Q16	I/O Pwr. Drvr.	ORG-VIO	J9-P9	RED-YEL BLU-YEL	J10-P1/2	50v DC	23-1100 090-5030-00T

Low Current Coils Group 1		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn or Meter #
#17	LEFT SLINGSHOT	Q17	I/O Pwr. Drvr.	VIO-BRN	J7-P2	BRN	J7-P1	20v DC	23-800 090-5001-00T
#18	RIGHT SLINGSHOT	Q18	I/O Pwr. Drvr.	VIO-RED	J7-P3	BRN	J7-P1	20v DC	23-800 090-5001-00T
#19	DROP SCREEN STEPPER #1	Q19	I/O Pwr. Drvr.	RED	J7-P4	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#20	DROP SCREEN STEPPER #2	Q20	I/O Pwr. Drvr.	GRN	J7-P6	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#21	DROP SCREEN STEPPER #3	Q21	I/O Pwr. Drvr.	BLK	J7-P7	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#22	TRIANGLE BILLBOARD	Q22	I/O Pwr. Drvr.	VIO-BLU	J7-P8	BRN	J7-P1	20v DC	Relay Bd. 520-5010-00
#23	DROP SCREEN STEPPER #4	Q23	I/O Pwr. Drvr.	BLU	J7-P9	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#24	OPTIONAL COIN METER	Q24	I/O Pwr. Drvr.	VIO-GRY	J7-P10	RED	J16-P7	5v DC	Meter 5v 091-5000-00

Diode On Terminal Strip (if noted)

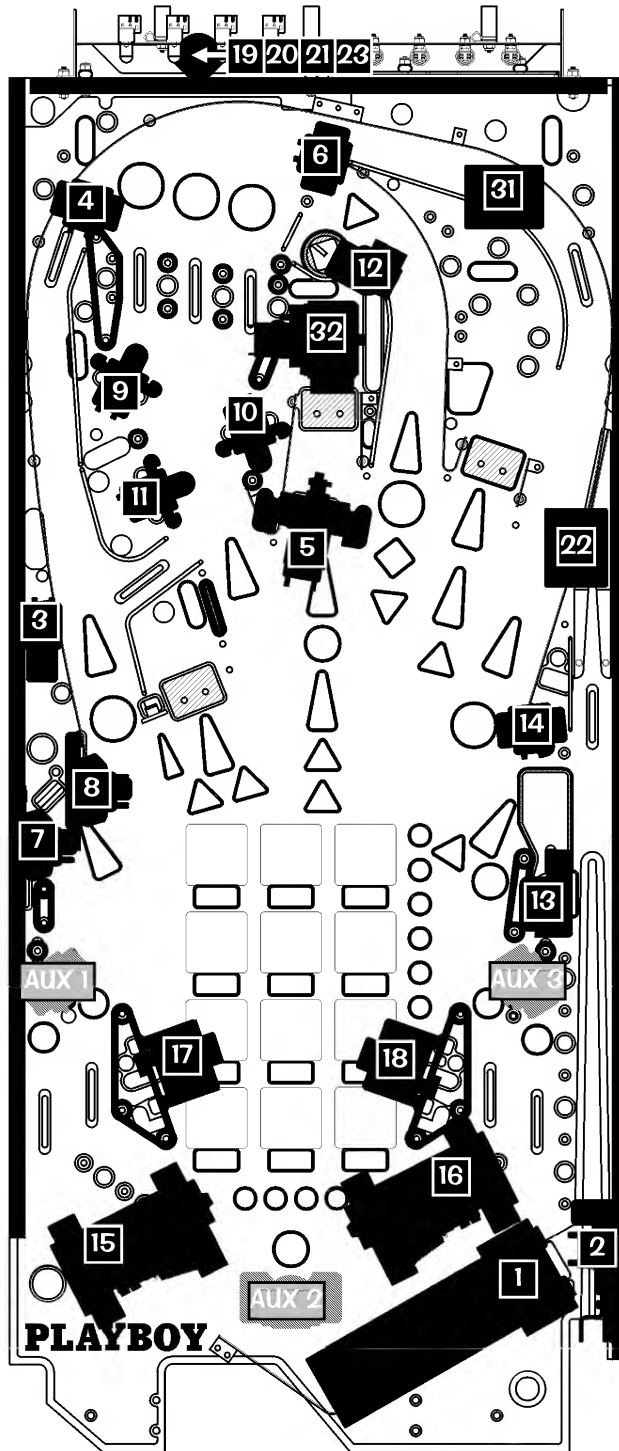
Low Current Coils Group 2		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Bulb Type
#25	FLASH: TRIANGLE X1	Q25	I/O Pwr. Drvr.	BLK-BRN	J6-P1	ORG	J6-P10	20v DC	#89 Bulb 165-5000-89
#26	FLASH: MIRROR X4	Q26	I/O Pwr. Drvr.	BLK-RED	J6-P2	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#27	FLASH: BACK LT X1 BACK RT X1	Q27	I/O Pwr. Drvr.	BLK-ORG	J6-P3	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#28	FLASH: LT SLINGSHOT X1	Q28	I/O Pwr. Drvr.	BLK-YEL	J6-P4	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#29	FLASH: RT SLINGSHOT X1	Q29	I/O Pwr. Drvr.	BLK-GRN	J6-P5	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#30	FLASH: TRIPLE JACPOX X1	Q30	I/O Pwr. Drvr.	BLK-BLU	J6-P6	ORG	J6-P10	20v DC	#89 Bulb 165-5000-89
#31	CENTERFOLD ON/OFF	Q31	I/O Pwr. Drvr.	BLK-VIO	J6-P7	BRN	J7-P1	20v DC	DC Relay 520-5066-00
#32	CENTERFOLD OPEN/CLOSE	Q32	I/O Pwr. Drvr.	BLK-GRY	J6-P8	BRN	J7-P1	20v DC	(Motor) 041-5075-04

Note: In Test Flash Lamps Menu ("Flash" Icon), Flashers tested are all Flash Lamps located between Q1-Q32 (This Game: Q25-Q30)

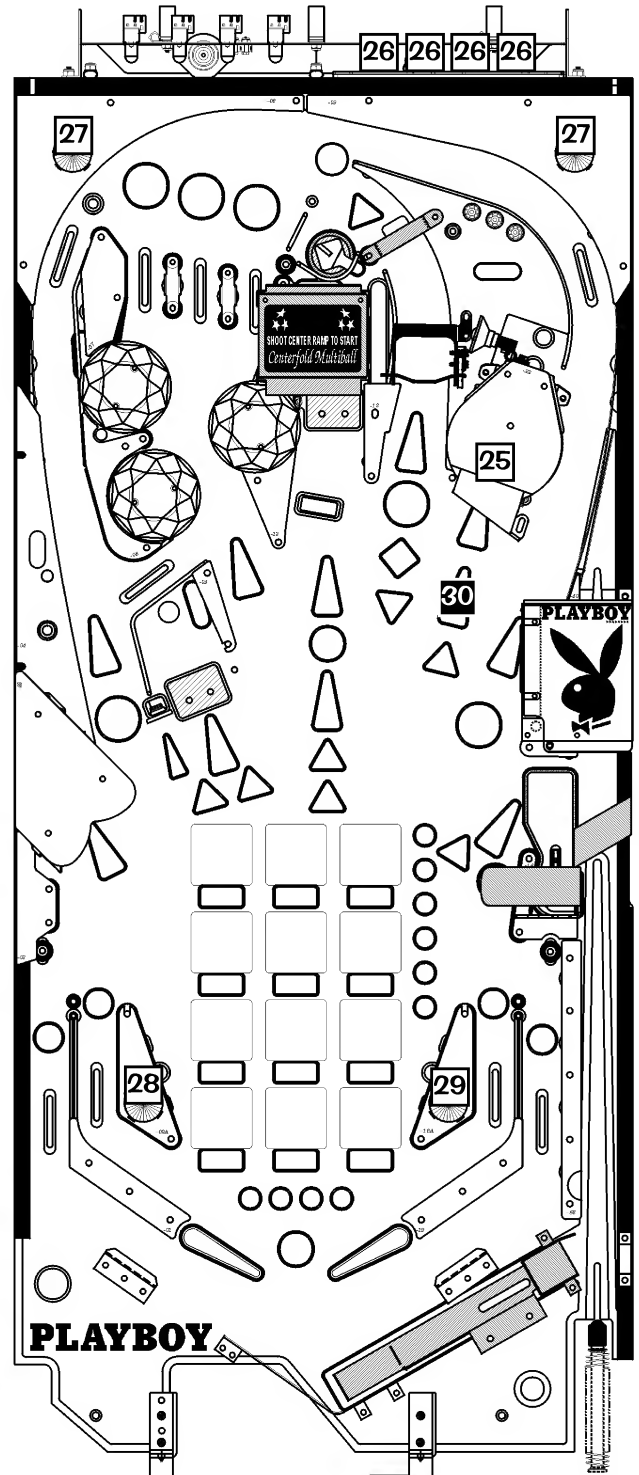
Auxilliary (UK ONLY)		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn
AUX 1: LEFT UP/DOWN POST	Q1	Sol. Expander (Aux. Board)		WHT	CN2-P5	BRN	J7-P1	20v DC	26-1200 090-5044-00T
AUX 2: CENTER UP/DOWN POST	Q2	Sol. Expander (Aux. Board)		RED	CN2-P4	BRN	J7-P1	20v DC	23-1100 090-5030-00T
AUX 3: RIGHT UP/DOWN POST	Q3	Sol. Expander (Aux. Board)		ORG	CN2-P3	BRN	J7-P1	20v DC	26-1200 090-5044-00T



COIL LOCATIONS

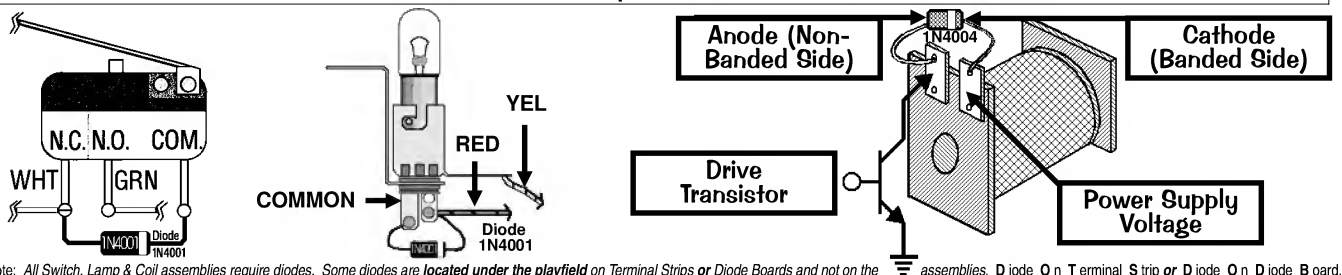


FLASH LAMP LOCATIONS



Legend Note: = Coils/Flashers mounted above P/F. = Coils/Flashers mounted below the P/F. = ...mounted in/on Cabinet.

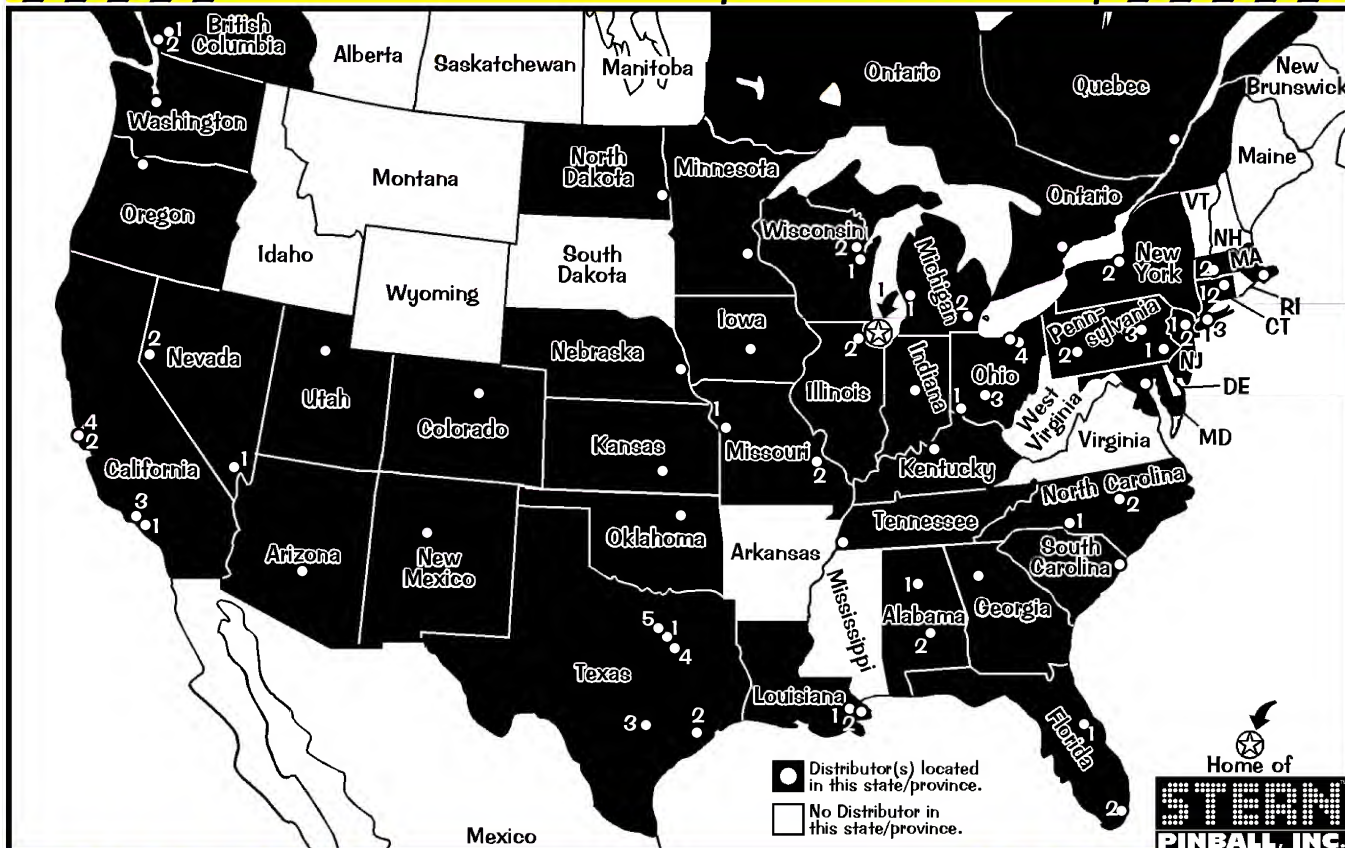
TYPICAL SWITCH, LAMP & COIL WIRING



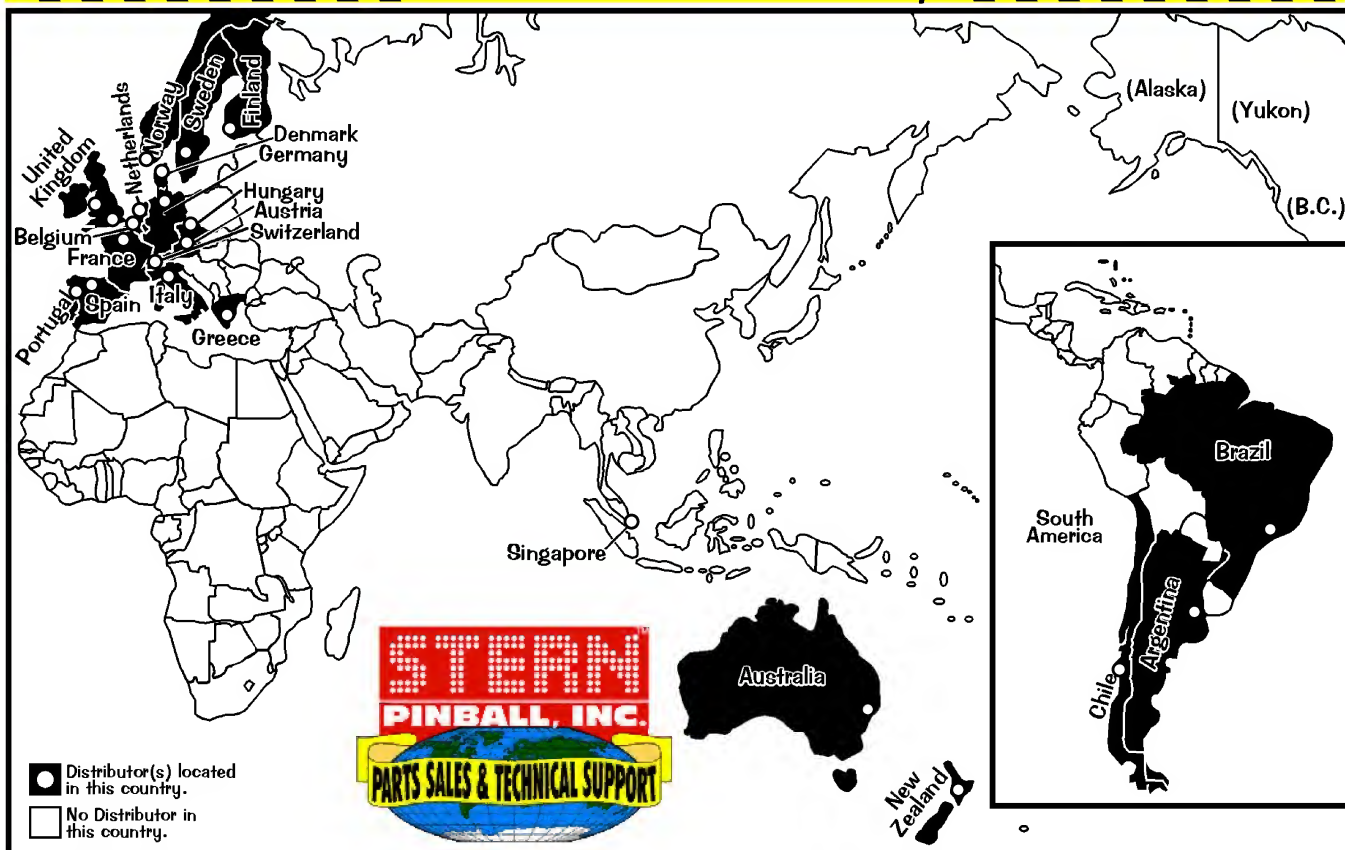
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PLAYBOY

Domestic Pinball & Redemption Distributors Map



International Distributors Map



For *Parts & Service*, call your nearest Distributor. View the above maps & the directories on the next page to locate your closest Distributor in your state, province, or country. Distributors and phone numbers are subject to change. Call **Stern™ Pinball, Inc. (Parts Sales & Technical Support)** with any questions or if your Distributor cannot help you: 1-800-542-5377 (in USA or Canada) or 1-708-786-5466. Visit us at www.SternPinball.com for current Distributor Information & other pinball needs.



Domestic Pinball & Redemption Distributors Directory

ALABAMA Birmingham Vending Birmingham (1) 1-205-324-7526 Franco Distributing Montgomery (2) 1-334-834-3455	IOWA Greater America Dist. Johnston 1-515-278-4455 Moss Distributing Des Moines 1-515-266-6422	MINNESOTA Lieberman Music Minneapolis 1-612-887-5299 MISSOURI Greater America Dist. Kansas City (1) 1-816-531-4300 Shaffer Distributing St. Louis (2) 1-314-645-3393	NORTH DAKOTA M.H. Associates, Inc. Fargo 1-701-282-7877 OHIO Atlas Distributing Cincinnati (1) 1-513-851-4100 Cleveland Coin Cleveland (2) 1-216-692-0960 Shaffer Distributing Columbus (3) 1-614-421-6800 Macedonia (4) 1-330-467-4850	TEXAS Commercial Music Dallas (1) 1-214-741-6381 H.A. Franz, & Co. Houston (2) 1-713-523-7366 San Antonio (3) 1-210-226-6322 Master Sales Corsicana (4) 1-903-874-4740 Southgate Amusement Houston (2) 1-713-691-7335 San Antonio (3) 1-210-225-3844 Southgate/Moss Dist. Irving (5) 1-972-721-4600	CANADA ONTARIO Starburst Coin Mach. Toronto 1-416-251-2122 Parts & Service Only: BRITISH COLUMBIA Can. Coin Machine Burnaby (1) 1-604-420-4008 Pacific Vending Vancouver (2) 1-604-324-2164 QUEBEC Laniel Automatic Mach. Montreal 1-514-731-8571
ARIZONA Mountain Coin Phoenix 1-602-269-7596 CALIFORNIA Betson West Buena Park (1) 1-714-228-7500 So. San Francisco (2) 1-650-952-4220 C.A. Robinson Los Angeles (3) 1-323-735-3001 San Francisco (4) 1-650-871-4280	INDIANA Atlas Distributing Indianapolis 1-317-786-6892 Cleveland Coin Indianapolis 1-317-895-4270 Shaffer Distributing Indianapolis 1-317-899-2530 KANSAS United Dist., Inc. Wichita 1-316-263-6181 KENTUCKY Atlas Distributing Louisville 1-502-966-5266	NEBRASKA Central Dist. Omaha 1-402-493-5600 Greater America Dist. Omaha 1-402-553-2812 NEVADA Mountain Coin Las Vegas (1) 1-702-798-0900 Reno Game Sales Reno (2) 1-775-829-2080	OKLAHOMA Galaxy Distributing Tulsa 1-918-835-1166 OREGON Mountain Coin Portland 1-503-234-5491 Specialty Coin Products Portland 1-800-987-4946	UTAH Mountain Coin Salt Lake City 1-801-262-5494 Struve Distributing Salt Lake City 1-801-328-1636	
COLORADO Mountain Coin Denver 1-303-427-2133 CONNECTICUT Betson Enterprises Milford (1) 1-203-878-6966 TDM Distributing Williamantic (2) 1-860-423-1403	LOUISIANA AMA Distributors, Inc. Metairie (1) 1-504-835-3232 New Orleans Novelty New Orleans (2) 1-504-888-3500	NEW JERSEY Betson Enterprises Carlstadt (1) 1-201-438-1300 Carteret (2) 1-732-750-2700 Jack Guarneri Service Co., Inc. (Pinballsales.com) Lakewood 1-732-364-9900	PENNSYLVANIA Betson Enterprises King Of Prussia (1) 1-610-265-1155 Pittsburgh (2) 1-412-331-8703 Cleveland Coin Pittsburgh (2) 1-412-323-8400 Green Coin Pittsburgh (2) 1-412-881-8804	WASHINGTON Mountain Coin Seattle 1-206-682-5700 WISCONSIN Pioneer Sales & Svc. Green Bay (1) 1-920-336-5800 Menomonee Falls (2) 1-262-781-1420 Lieberman/Viking Vend. Menomonee Falls (2) 1-262-255-6580	
FLORIDA Birmingham Vending Orlando (1) 1-407-425-1505 Brady Distributing Miami [Miramar] (2) 1-954-874-1100 Orlando (1) 1-407-872-1666	MARYLAND Betson Enterprises Baltimore 1-410-646-4100 Weiner Distributing Baltimore 1-410-525-2600	NEW MEXICO Mountain Coin Albuquerque 1-505-345-7706	GREEN COIN Pittsburgh (2) 1-412-881-8804 Roth Novelty (Superior) Wilkes-Barre (3) 1-570-824-9994		
GEORGIA Greater Southern Dist. Smyrna 1-770-803-3040	MASSACHUSETTS Betson Ent. (NECO) Norwood (1) 1-781-769-9760 Gekay Sales E. Longmeadow (2) 1-413-525-2700	NEW YORK Betson Enterprises New Hyde Park (1) 1-516-354-4647 Syracuse (2) 1-315-455-5400 Deith Distributing Roslyn Heights (3) 1-516-621-1234	SOUTH CAROLINA Green Coin Myrtle Beach 1-843-626-1900		
ILLINOIS American Vending Elk Grove Village (1) 1-847-439-9400 Atlas Distributing Elk Grove Village (1) 1-847-952-7500 World Wide Distributing Chicago (2) 773-384-2300	MICHIGAN Atlas Distributing Wyoming (1) 1-616-241-1472 Cleveland Coin Livonia (2) 1-734-432-1040	NORTH CAROLINA Brady Distributing Charlotte (1) 1-704-357-6284 Operators Distributing Archdale (2) 1-336-884-5714	TENNESSEE Brady Distributing Memphis 1-901-345-7811 Green G.A.M.E.S. Memphis 1-901-353-1000		

Note: For states and Canadian Provinces which do not have Distributors, call the neighboring state or province with the city closest to you (indicated with a white dot). States or Provinces with more than 1 city containing a distributor are numbered. View the map on the previous page.

Note: Distributors are subject to change. Visit us at www.SternPinball.com for current Distributor Information.

International Distributors Directory

ARGENTINA Universe Electronics Buenos Aires [54] 1865-4730 Electroport (Florenia) Mar Del Plata [54] 22-3495-5532	BRAZIL DiverBras São Paulo [55] 1166-741000 CHILE Cuinsa Santiago [56] 2641-8520	FRANCE Avranches Automatic Ducey [33] 2338-96162 SFA Paris [33] 1532-68082	ITALY (RSM) Tecnoplay S.A. San Marino [39] 5499-00361 NEW ZEALAND Amco Machine Supplies Auckland [64] 9846-7606	SINGAPORE Valibel Technologies Singapore [65] 748-8404 SPAIN Commercial Cocomatic Madrid [34] 9167-16980	UNITED KINGDOM Electrocoin London, England [44] 2089-652055 Electrocoin Aftersales Cardiff, S. Wales [44] (0) 2920 343888
AUSTRALIA Amusement Mach. Dist. Matraville [61] 2931-66000 AUSTRIA R. Rupp Kaindorf [43] 3452-86105	DENMARK Vendcomatic (Oslo, Norway) [47] 2291-8383 FINLAND Pelika Ray-Oy Espoo [35] (0) 5892-90452-99	GERMANY Bergmann Automaten Hamburg [49] 4101/30 24-0 GREECE Elcoin Nikea [30] 1492-9357 Greece Coin Athens [30] 1577-7012	NORWAY Vendcomatic Oslo [47] 2291-8383 PORTUGAL Jacinto & Martins, Lda. Amadora [35] 1214-963744	SWEDEN Call for Information or visit our website www.SternPinball.com SWITZERLAND Novomat, A.G. Harkingen [41] 6238-88961	
BELGIUM Brabo Antwerpen [32] 3238-9970					



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POWER REQUIREMENTS



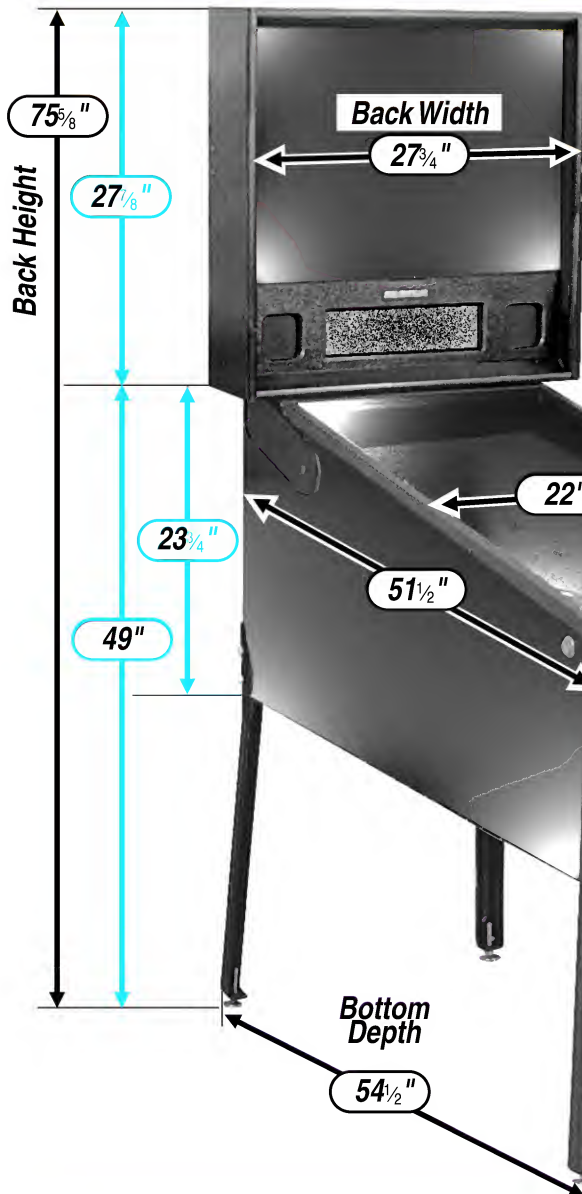
This game **must be connected to a properly grounded outlet to reduce shock hazard** & insure proper game operation. See Sec. 5, Schematics & Troubleshooting, Chp. 3, Cabinet Wiring (Transformer Power Wiring), for transformer connections required for **Normal, High, and Low Line** conditions.



Normal Line:	110v AC - 125v AC @ 60Hz	
Domestic uses an 8AMP 250v Slo-Blo Fuse.	AVG OPERATION	MAX OPERATION
	CURRENT: 2.8AMP WATTAGE: 329w	CURRENT: 8AMP WATTAGE: 940w
High Line:	218v AC - 240v AC @ 50Hz	
Export uses 5AMP 250v Slo-Blo Fuses. (*England & Hong Kong use an 8AMP 250v S/B Fuse.)	AVG OPERATION	MAX OPERATION
	CURRENT: 1.8AMP WATTAGE: 412w	CURRENT: 5AMP 8AMP* WATTAGE: 1145w 1832w*
Low Line:	95v AC - 108v AC @ 50Hz / 60Hz	
Export Japan Only uses an 8AMP 250v Slo-Blo Fuse.	AVG OPERATION	MAX OPERATION
	CURRENT: 2.6AMP WATTAGE: 264w	CURRENT: 8AMP WATTAGE: 812w

England & Hong Kong use an 8A Fuse.

TRANSPORTATION



BEFORE TRANSPORTING



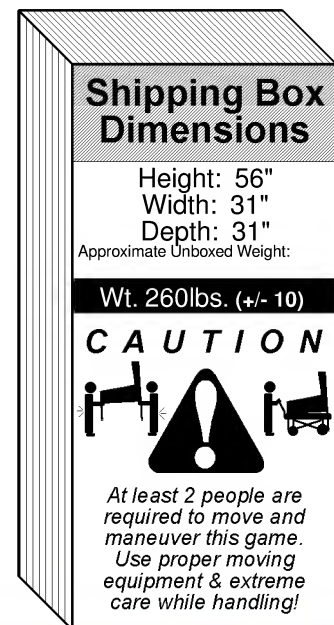
To reduce the possibility of damage, observe **ALL** precautions whenever transporting the game. **Read & follow Section 1, Chapter 1, Pinball Game Set-Up Procedures, & How to Secure the Backbox for Transporting.** Remove the legs & secure the game within the transporting vehicle.

Save and retain all printed information on the game.

The overall **Front** (37") & **Back** (75 5/8") dimensions reflect the **ADDED +1 1/4"** height with the **Leg Levelers** turned all the way in.

The Cabinet is **designed** to give the recommended **6.5° pitch to the Playfield** when all four (4) **Legs** are installed with the **Leg Levelers** turned all the way in.

With the **Leg Levelers** turned all the way out, an additional **1 1/4" MORE** to the overall height should be added to the dimensions.



GAME DIMENSIONS





Pinball Game Service Manual General Table of Contents

See Sections 3 & 5, Table Of Contents, for details of that Section and it's Chapters.

(4) Pinballs ▶ ... "Additional Photo Inserts" Kit ▶ New to Portals!.....Inside Front
▶ Backbox Layout Locations: Fuses, Bridges, Relays & ROMs DR. 1
▶ Find-It-In-Front: Dr. Pinball Section Explained ▶ How It Works DR. 2
▶ Diagnostic Aids ▶ CPU DIP Switch Setting ▶ ROM Summary Table DR. 3
▶ Switch Matrix Grid & Dedicated Switches ▶ Lamp Matrix Grid DR. 4
▶ Switch & Lamp Matrix Grid Locations DR. 5
▶ Coils Detailed Chart Table DR. 6
▶ Coil & Flash Lamp Locations DR. 7
▶ Domestic Pinball & Redemption and International Distributors Maps..... DR. 8
▶ Domestic Pinball & Redemption and International Distributors Directories DR. 9
▶ Power Requirements ▶ Transportation ▶ Game Dimensions DR. 10
Game Manual General Table of Contentsi-ii

SECTION 11-4

Chapter 1, After Set-Up..... 1
▶ Pinball Game Set-Up Procedures.....1
▶ Pinball Game Set-Up Future Reference.....2-3
▶ How to Secure the Backbox... ▶ Leg Leveler Adjustment ▶ Easy Access... - 3 Positions.....4

SECTION 25-6

Chapter 1, Game Operation & Features 5
▶ Start of Game Features (Starting a Normal Game, Starting Team Play, Starting League Play)
▶ During Game Features (Feature Mode & Combination Shots, Multiball, Replay Feature)
▶ End of Game Features (Game Endings, Match Features, Entering Initials/Name) 5
▶ Auto Percentaging ▶ Instruction Card6

SECTION 3 7-54

▶ Portals™ Service Menu System Table of Contents (detailed outline of this section)..... 7
▶ Portals™ Service Switch Set Access & Use (Function 1, ...; Function 2, ...; Function 3, ...)8
Chapter 1, Portals™ Service Menu Introduction..... 9
▶ How to Use This Section.....9
▶ Portals™ Service Menu Icon Tree10-11
▶ Portals™ Service Menu Example ▶ Exiting the Portals™ Service Menu12-14
Chapter 2, Go To Diagnostics Menu 15-31
Chapter 3, Go To Audits Menu 32-37
Chapter 4, Go To Adjustments Menu..... 38-46
Chapter 5, Go To Installs Menu 47-50
Chapter 6, Go To Reset Menu..... 51-52
Chapter 7, Go To Tournament Menu (Future Expansion) 53-54

SECTION 4 55-70

Chapter 1, Parts Identification & Location (The Pink Pages)55
Overview..... 55
Playboy Backbox Assembly56
Speaker Panel Assy. for the Backbox & Associated Parts:..... 57
Cabinet - General Parts & Switches.....58-59
Playfield - General Parts & Switches (Below)60
Playfield - General Parts & Switches (Above) 61
Playfield - Rubber Parts (Rings Actual Size)..... 62
Playfield - Plastics (Screened & Clear) Photo Inserts & Decals63

Section 4, Chapter 1, Parts Identification & Location (The Pink Pages) Continued on the Next Page

Playfield - Rails, Wire Forms & Ball Guides and Misc. Ramp	64
Playfield - Metal Posts (Screws) and Nuts (Actual Size)	65
Playfield - Metal Spacers (Actual Size)	66
Playfield - Plastic Posts and Spacers (Actual Size)	67
Playfield - Small Bayonet Type Bulbs and Sockets (Actual Size)	68
Playfield - Large Bayonet Type Bulb and Sockets (Actual Size)	69
Playfield - Wedge Base Bulbs and Sockets (Actual Size)	70
Chapter 2, Drawings for Major Assemblies & Ramps (The Blue Pages)	71-94
▷ Overview	71
Ball Shooter (Plunger) Assembly, 500-6146-00-04	(Top) 72
Autoplunger Coil Assembly, 500-6092-05 with Arm Weld Assembly, 500-6091-00	(Bot) 72
4-Ball Trough Assembly, 500-6318-24 and Associated Parts:	73
Flipper (Left) Assembly, 500-5944-14 and Associated Parts:	74
Flipper (Right) Assembly, 500-5944-04 and Associated Parts:	75
Slingshot Assemblies, 500-5849-00 (Qty. 2)	(Top) 76
30° Eject Assembly, 500-6511-01	(Bot) 76
Turbo (Pop) Bumper Top Assy., 515-6459-01 (Qty. 3)	(Top) 77
Turbo (Pop) Bumper Bottom Assy., 515-6459-04 (Qty. 3)	(Mid) 77
Turbo (Pop) Bumper Switch Assy., 515-6459-03 (Qty. 3) and Associated Parts:	(Bot) 77
Bead Curtain Bottom (Left) (515-7216-00*) & Bottom (Right) (515-7216-01*) Assemblies	78
Bead Curtain Top Assembly (515-7215-00*)	79
Exit Scoop (Playboy Rabbit Head), 535-6090-00	(Top) 80
VUK (Left Style) Assembly, 500-6290-00	(Bot) 80
Ball Deflector Assembly, 500-6433-00	(Top) 81
Ball Lock (Long Plunger) Assembly, 500-5867-04	(Bot) 81
Up/Down Post Assembly, 500-5788-06	(Top) 82
Ball Deflector (Wide Plunger Top) Assembly, 500-5788-07	(Bot) 82
Magazine Assembly (500-6556-00*)	83
Rotating Triangular Billboard Assembly (500-6546-00*)	84-85
1-Bank Drop Target Assembly, 500-6440-11	86-87
Centerfold Lower Assembly (515-7224-00*)	88
Centerfold Upper Assembly (515-7227-00*)	89
Left Wire Ramp, Left & Middle Ramps & Individual Parts	90
Right Wire Ramp, Right Ramp & Individual Parts	91
Back Panel Display & Stepper Motor Assembly (500-6552-00*)	92-93
* Not Sold as an assembly, order the individual part(s) actually required.	
▷ UK ONLY OPTIONAL: Ball Deflector Assemblies, 500-5788-02 (Qty. 2)	(Top) 94
▷ UK ONLY OPTIONAL: Up/Down Post Assembly, 500-6293-00	(Bot) 94

SECTION 5 95-136

▷ Schematics & Troubleshooting Table of Contents (detailed outline of this section)	95
▷ Coils Detailed Chart Table	96
Chapter 1, Backbox Wiring (The Yellow Pages)	97-98
Chapter 2, Playfield Wiring (The Yellow Pages)	99-102
Chapter 3, Cabinet Wiring (The Yellow Pages)	103-104
Chapter 4, Printed Circuit Boards (PCBs) (The Yellow Pages)	105-136

APPENDIXES A-J A1-J1

▷ Appendixes A-J Table of Contents (outline of this section)	after 136
▷ Appendixes A-J	A1-J1
Plastic Part Color Chart	(Bottom) H1 + (Top) I1
Glossary of Terms	Last Page
Limited Warranty, Cautions, Warnings & Notices	Last Page
► Switch Matrix Grid & Dedicated Switches ► Lamp Matrix Grid	Inside Back



After Set-Up

Pinball Game Set-Up Procedures

...after reading the Pinball Game Set-Up Instruction Sheet (SPI Part № 755-5310-00) included with your New Pinball Game, continue with the below procedures:

With the Back Glass Removed:

1. Check all connectors in the Backbox for loose wire terminations. Reseat any loose wire by pushing in on the terminal. Push on all connectors plugged into the CPU/Sound Board, I/O Power Driver Board, and the Display Power Bd. to check that they are properly seated. Ensure Fluorescent Light Tube is seated correctly. Check that all fuses are seated properly. Close and lock the Backbox and secure its keys back inside the Coin Door.

With the Playfield Glass Removed:

2. Make sure the proper amount of pinballs were installed (Amount of balls are always specified on decal attached to the lock down assembly and at the top of the inside cover).

3. Remove all shipping tie downs, shipping blocks, packing foam, shipping instruction pages, etc. (if any) from the game. **READ ALL PRINTED INFORMATION!** Shipping instructions, labels and/or decals describe warnings, cautions, and/or important information specific to the game. **SAVE ALL PRINTED INFORMATION.**

4. Raise the playfield and support it, by lifting the **Prop Rod** (located on the left, inside the cabinet). The end of the Prop Rod should be placed into the hole under playfield. See the illustration "Easy Access Service System - 3 Positions" on Page 4.

5. Visually inspect all cabinet cables and connector terminations; ensure no wires or cables are pinched and that cable harnesses are not pulled tight.

6. Lower the playfield and ensure game is **level side-to-side** by adjusting Leg Levelers, if required. See the illustration "Leg Leveler Adjustment" on Page 4. Start with the Leg Levelers turned all the way in (1.25" from floor to bottom of leg), depending on the condition of the floor, adjust the Leg Levelers as required until the **game pitch is 6.5°**, determined by the Bubble Level.

USE THE BUBBLE LEVEL ON THE WOOD RAIL (LOWER RIGHT) TO DETERMINE IF LEVEL IS ACHIEVED. BUBBLE SHOULD APPEAR BETWEEN THE 2 BLACK LINES. SEE PAGE 4 FOR AN ILLUSTRATION.

The playfield incline affects difficulty of play. Use the recommended incline; Game difficulty is best varied using game adjustments.

With the Coin Door Open:

- If desired, perform any self tests at this time (see Section 3, Chapter 1, **Portals™ Service Menu Introduction**, and Chapter 2, **GO TO DIAGNOSTICS MENU**, for instructions on how to enter "Begin Play Test" and "Game Name Test" Menus to test components on the game).
- If desired, adjust **Game Pricing, Standard and/or Custom** (see Section 3, Chapter 4, **GO TO ADJUSTMENTS MENU** and Section 3, Chapter 5, **GO TO INSTALLS MENU** to adjust **Game Difficulty, 3- or 5-Ball Play, Home or Tournament Settings, Novelty, Add-A-Ball**, etc.).

CE Per CE: "The appliance has to be placed in a horizontal position."
"This appliance is not to be cleaned by a Water Jet."

After Set-Up

PLAYBOY

Section 1, Chapter 1
Page 1

Pinball Game Set-Up Future Reference

Open up the Printable Version in both 8-1/2 X 11 & 11 X 17.

Sec. 1: After Set-Up

CAUTION: At least 2 people are required to move and maneuver game.

Use proper moving equipment & extreme care while handling. Pinball game is 260lbs (+/- 10).

Refer to Game Manual for further Game Set-Up Procedures (Sec. 1, Chp. 1) and other important information!

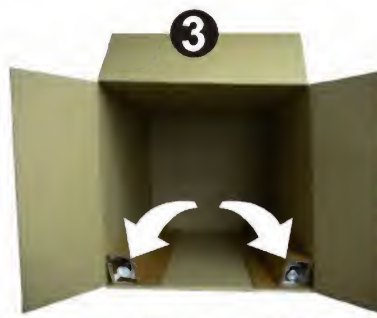
TOOLS REQUIRED: 5/8" Socket Wrench & Utility Knife



1. Before opening box, lay the box flat on its side with "TRUCK THIS SIDE ONLY" facing the floor.



2. Slide game out using the **Black Nylon Strapping** as a handle.



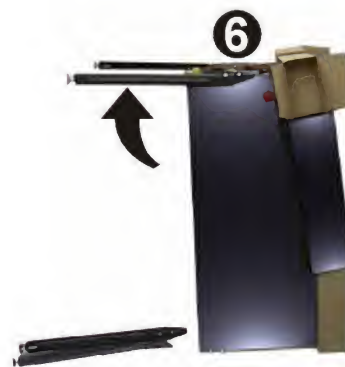
3. Remove the **Four (4) Identical Legs with Levelers** from the carton and set aside. (**SAVE!** all packing materials and information sheets related to this pinball until Set-Up is complete.)



4. At this point **DO NOT CUT STRAPPING** (You want to keep the Backbox secured in the down position). Loosen and remove the 8 Leg Bolts (use 5/8" Socket Wrench) and set aside.



5. Lift game into an **UPRIGHT POSITION** (Coin Door Facing Up).



6. Install **FRONT LEGS** using the bolts removed from **Step 4**. Secure tightly. **Take care not to scratch the Black Finish on any of the Legs.**



7. Carefully set the game down on the **FRONT LEGS**. Care should be taken...Game is heavy, two (2) people are recommended for this and the following step.



8. Using supports or two (2) people, prop the rear of the cabinet up and install **REAR LEGS**. Secure tightly.



9. Cut **BLACK NYLON STRAPPING**. **CAUTION:** Strapping will **SNAP**, protect your eyes! Use extreme care when using a utility knife or scissors.



Pinball Game Set-Up Future Reference Continued



10. Lift the Backbox into the **UPRIGHT POSITION** (Ensure the cables do not get pinched).



11. After the **BACKBOX** is in the **UPRIGHT POSITION**, locate the **5/16" HEX KEY**. While inserted, rotate **KEY** with a **3/4 turn** until latched & locked.



12. The next step you will remove the **PLAYFIELD GLASS & BACK GLASS** to access the inside of the cabinet & Backbox.

NOTE: KEYS are tied to the **Shooter Rod*** (if equipped) or taped to the **Playfield Glass** (if equipped with **Auto Plunger Button**). Remove keys. One (1) set of keys opens the **Coin Door**, the other set is used to unlock the **Back Glass** to gain access to the **White Star Board System**.



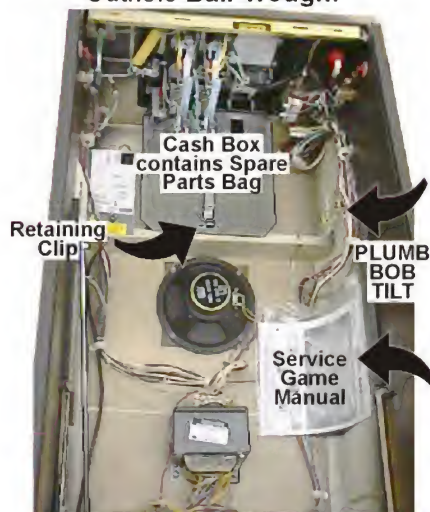
13. Open the **Coin Door** and pull the **YELLOW HANDLE** to the **LEFT** and at the same time pull up on the **FRONT TOP MOLDING** and remove. The **GLASS** can now be pulled out towards you and removed. **TAKE CARE** while moving; set glass on a safe surface.



14. Through the open **Coin Door**, remove the **RETAINING RING** at the rear of the **CASH BOX** and open. Remove the **PINBALLS** & the **PLUMB BOB** from the **SPARE PARTS BAG**. (Save the other spare parts in cabinet). Install the **PINBALLS** by placing them on the playfield so they can roll into the **Outhole Ball Trough**.



15. Install the **PLUMB BOB** on the **Hanger Wire** & tighten the **Thumb Screw**. Loosening the **Thumb Screw** & lowering or raising the **PLUMB BOB** makes the **Games Tilt Function** more or less sensitive.



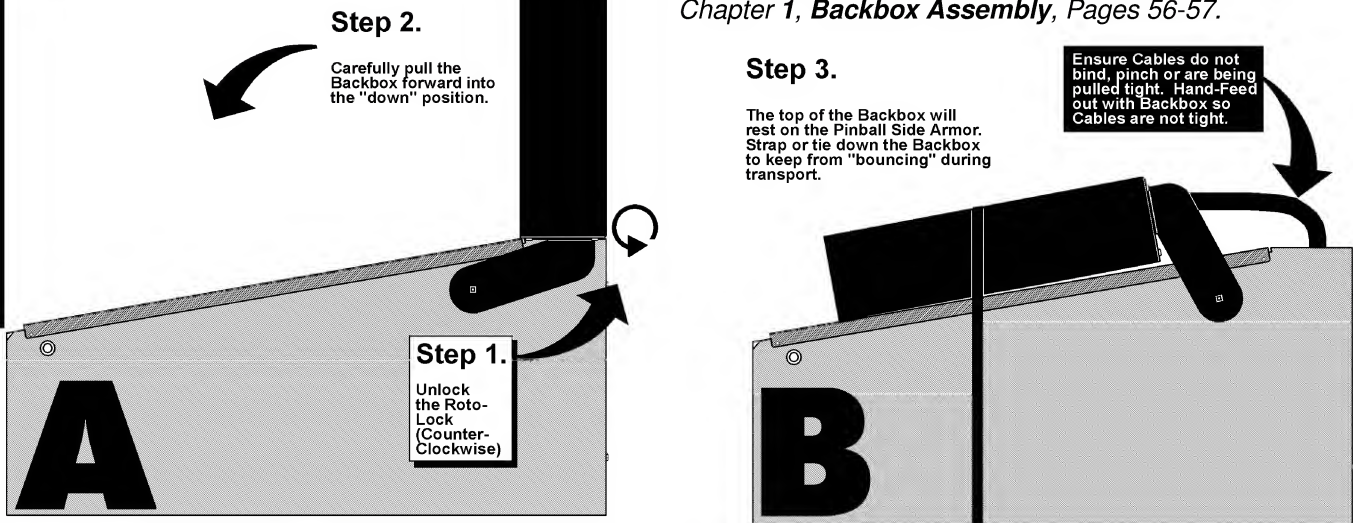
Remove the **PINBALL GAME MANUAL** (stapled to side of the left wall of the cabinet). Review **Section 1, Chapter 1**, which describes how to lift the playfield to access the **Plumb Bob Tilt Assembly**. The manual gives you all the important information you need to prepare for final set-up and other important information (such as **Parts, Diagnostics, Schematics** and more...).

ALWAYS STORE THE MANUAL & INFORMATION SHEETS INSIDE THE CABINET WHEN NOT USING.

How to Secure the Backbox for Transporting

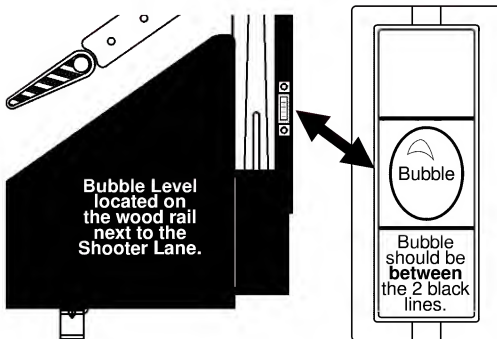
Sec. 1: After Set-Up

For more Backbox details & part numbers, see Section 4, Chapter 1, **Backbox Assembly**, Pages 56-57.



Leg Leveler Adjustment

Attach the four (4) Leg Assemblies to cabinet corners with the eight (8) leg bolts provided.



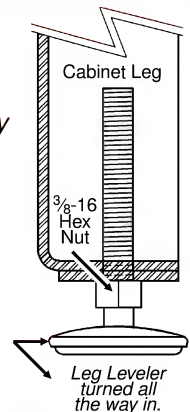
Start adjustment with the leg levelers *turned all the way in*.

View the *bubble* in the level provided on the right side wood rail.

Adjust the front or rear levelers as necessary to cause the bubble to float between the two (2) black lines.

Use a pinball to roll down the center of the playfield for side-to-side leveling.

YOUR PLAYFIELD PITCH IS NOW AT 6.5° AS REQUIRED FOR PROPER GAME PLAY!



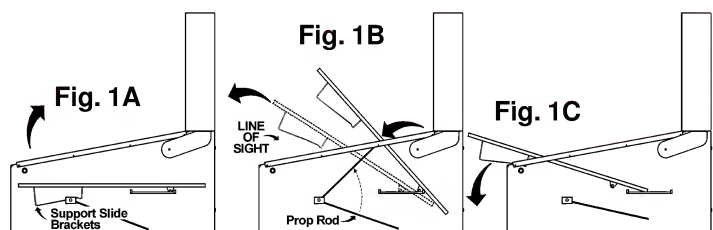
Note: For custom adjustment greater than >6.5° can be achieved by turning out the rear leg leveler(s), however, *it is not recommended*.

Easy Access Service System - 3 Positions

With the front molding & glass removed, carefully lift the playfield (take care when using the Bottom Arch to hoist).

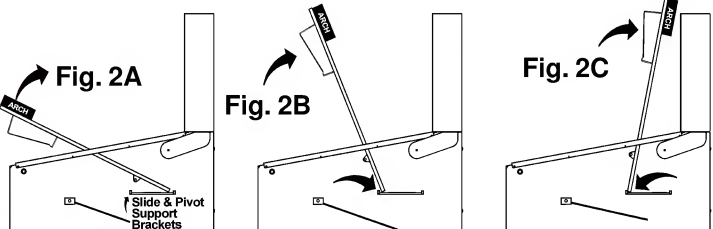
Positions 1 & 2

When lifted high enough, the **Playfield Support Slide Brackets** (Fig. 1A) can be seen & can clear the cabinet front. At this time, pull the playfield toward the front of the cabinet, checking that the mechanical components clear the cabinet front, then rest the playfield on the **Playfield Support Slide Brackets** at the front channel of cabinet (Fig. 1C); Or, the **Prop Rod** (located on the right inside of cabinet) can be used by positioning the **Prop Rod** end into the receiving playfield hole (Fig. 1B).



Position 3

With the playfield at rest, hold the sides & pull toward the front of the cabinet (approx. 6" to 8"), until resistance is felt from **Edge Slide Brackets** stopping against the **Slide & Pivot Support Brackets** located on either side of the cabinet (Fig. 2A). At this time, swivel the playfield toward the Backbox, then rest on the top edge (Fig. 2B & 2C).



Game Operation & Features

Start of Game Features

Starting a Normal Game

Insert coin(s). The game generates a sound for the first coin & for each subsequent coin with the display indicating the number of credits posted. Press the **Start Button** and a start-up sound is produced, and the posted credits are reduced by one. Subsequent players can be added (**up to 4 can play!**) by pressing the **Start Button** before the end of ball 1 (with sufficient credit in the game).

The display now indicates the player or # of players selected from the total depressions of the **Start Button**. The display indicates the ball in play, and a ball is served to the *Shooter Lane*. An introduction is shown followed by Skill Shot Graphics and/or instructions. Pressing the **Start Button** after ball 1 of any player will start a new game (if credits are available), **but only** if the **Start Button** is depressed for 2-3 seconds. This delay is to avoid accidental "re-starts" of a game. *(Note: Any partial credit remaining during game play after the end of ball 1, or power down, will be eliminated.)*

Starting Team Play (Doubles!)

Team Play is a four player game. The totals for players 1 & 3 (Team 1) and players 2 & 4 (Team 2) are displayed individually as well as the combined score for both teams. Team Play only works in a 4-Player game. In all other cases, the individual scores are shown.

Starting League Play

After credit is posted, while holding in the **Left Flipper Button**, press the **Start Button**. League Play has now begun. The differences between Normal Game Play and League/Tournament Play are: There is no "auto-percentaging" (awarding extra balls, specials, etc. to players with very low scores on the second or third ball). Mystery Features are awarded in a set order rather than random in Normal Game Play. Percentage Game Features are not automatically advanced as they are for the Regular Play Features.

During Game Features

Feature Mode & Combination Shots

Features are lit on the playfield and started by completing *certain shots* (e.g. completion of Target Banks, Orbit(s), Ramp(s) and/or any combination of the shots).

Multiball

Multiball is started after completion of certain features. Multiball may vary with the amount of balls used depending on game style.

Replay Feature

Replay awards are given as the player exceeds a High Score Level during game play. This can be adjusted with **Adj. 3, Replay Awards** (Default = **CREDIT**). Players exceeding the High Score Levels can receive: **CREDIT**, **EXTRA BALL**, or **SPECIAL**. Adjust to **NONE** if a replay award is not desired.

End of Game Features

Game Endings

When all player(s) have played all balls (including any Extra Balls), the game ends. If power is interrupted during the course of a game, it will end that game (**see Starting a Normal Game**). Closure of the Plumb Bob Tilt Switch according to the number of tilts set, **Adj. 09, Tilt Warnings** (Default = **01**) or prolonged closure, will end the current Ball-In-Play. Closure of the Slam Tilt Switch on the Coin Door ends the current game(s).

Match Feature

At the end of each ball, earned bonuses are collected. At the end of the last ball of a game (including any extra balls, if applicable), earned bonuses are collected, then the system produces a random 2-digit number (a multiple of 10; 00 to 90). Matching the last 2 digits of the player's score with this number awards a credit. In **Adj. 07, Match Percentage** (Default = **8%**) can be changed from 0-10%. Changing the percentage to **0% displays** the "Match Animation" at the end of the game, however, will never match nor award anything. Changing this adjustment to **OFF** will **not display** the "Match Animation" nor award anything.

Entering Initials/Name

If player achieved a new high score in a game or achieved a special feature (if given) the player may enter 3 Initials. In **Adj. 24, High Score Initials** (Default = **3 Initials**) can also be changed to **10-Letter Name**. Use the **Flipper Buttons** to choose a letter or character as seen on the Dot Display. Hitting the **Start Button** locks in the letter or character and proceeds to the next letter. The game then proceeds into the *Game-Over Mode* and then to the *Attract Mode*.

Note: **Adj. 26, Custom Message** (Default = **ON**) can be displayed during the *Attract Mode*; enter letters in the same fashion.

For more details with Adjustments, see Sec. 3, Chp. 4.

Continued Next Page.

Auto Percentaging

This game is equipped with Auto Percentaging, **Adj. 01, Replays: Fixed/Auto** (Default = **12%**, adjustable). The *Replay Percent* is automatically adjusted or you can set a *Fixed Replay Score*. Four levels may be selected. Adjustments allow awarding of a "CREDIT" (or your setting) as each level is exceeded. This can be adjusted with, **Adj. 03, Replay Award** (Default = **CREDIT**). With the **Autopercentage Feature**, if the actual replay percentage is higher or lower than that desired, the game will automatically adjust for the new recommended percentage score(s). You may choose to make a different "score-to-beat" adjustment; this is done by utilizing **Adj. 02, Replay Levels**. For more details with **Adjustments**, see **Section 3, Chapter 4, GO TO ADJUSTMENTS MENU**; also, see **Section 3, Chapter 5, GO TO INSTALLS MENU** for further customization of your Pinball Game.

Instruction Card

Below is a **COPY** of the Game Instruction Card (SPI N°: 755-5176-10 USA) which is included with every game. If your card is lost or damaged, simply **COPY** this page and *cut out* the Instruction Card as a *temporary replacement* until a *new card* is ordered.

(Hint: **COPY & CUT** along the dotted line and fold in the center to keep the "COPY" sturdy.)

COPY &
CUT

PLAYBOY

For more detailed game rules, visit our website @
www.SternPinball.com and click on the
"PLAYBOY" or "Game Archive"
Pop Bumper Link.

FOLD
HERE

PLAYBOY

OBJECTIVE Collect **Playmates** to start *Mansion Mania*.
25  **Rabbit Heads = 1 Playmate.**

SKILL SHOT To open the **MAGAZINE** for a **Skill Shot**, plunge the ball lightly.

EXTRA BALL & SPECIAL Collecting **Playmates** will light **Extra ball** and **Special**.

CENTERFOLD MULTIBALL Shoot **Center Ramp** four times to open the **CENTERFOLD**. Keep **all three balls in play** to light the **TRIPLE JACKPOT TOY**.

Note to Beginners: To score better, shoot at the ((**FLASHING SHOTS**)) !!
Be sure to **LOOK UP** at the Dot Display for instructions when possible.

SPI PART N°: 755-5176-10 USA

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Section 3 Portals™ Service Menu System Table of Contents

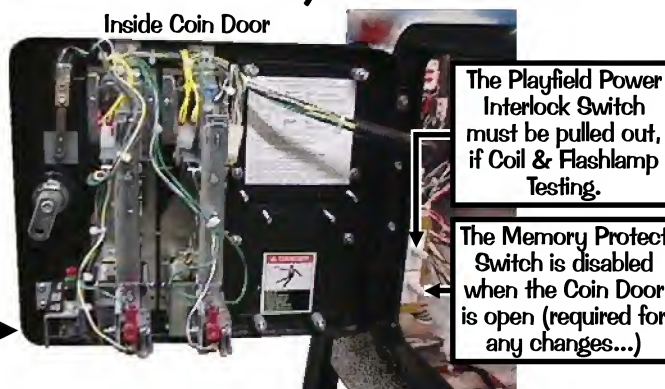


Service Switch Set (Red, Green & Black Buttons) Access & Use	8
◆ Function 1, Volume Menu / Function 2, Service Credits Menu / Function 3, Portals™ Service Menu	8
Chapter 1, • Portals™ Service Menu Introduction	9
How to Use This Section	9
Portals™ Service Menu Icon Tree for PLAYBOY Pinball	10-11
Portals™ Service Menu Example	12-13
QUIT THIS SESSION (Exiting the Portals™ Service Menu) & Problem / Solution Table	14
Chapter 2, • Go To Diagnostics Menu (Overview)	15
◆ GO TO DIAGNOSTICS MENU	15
• Go To Switch Menu (Switch Test, Active Switch Test and Dedicated Switch Test)	16
◆ Switch Matrix Grid & Dedicated Switches and Typical Switch Schematic & Wiring	16
◆ Switch Matrix Grid Descriptions with Part Numbers and Locations	17
• Go To Coil Menu (Single Coil Test and Cycling Coil Test)	18
◆ Coil & Flash Lamp Descriptions and Typical Coil Wiring	18
◆ Coil & Flash Lamp Locations	19
◆ Coils Detailed Chart Table	20
◆ Backbox I/O Power Driver Board Detailed Wiring Diagram	21
• Go To Lamp Menu (Single Lamp Test, Test All Lamps and Row & Column Lamp Tests)	22
◆ Lamp Matrix Grid	22
◆ Lamp Matrix Grid Locations and Typical Lamp Schematic & Wiring	23
• Test Flash Lamps	24
• Clear Ball Trough	24
• Technician Alerts (Switch Detection and Pinball Detection)	24-25
• Service Phone #	25
• Begin Play Test	25
• Fire Knocker	25
• Sound / Speaker Test (Speaker Phase Testing)	25-26
• Begin Burn In	26
• Dot Matrix Test (Dot Matrix Display Explained)	26
• Playboy Tests (Centerfold, Triangle & Stepper Motor Tests)	27-28
• Go To Fuse Table (Example)	29
BACKBOX LAYOUT LOCATIONS: Fuses, Bridges, Relays & ROMs	30
• Dr. Pinball (Coil Flow Chart, Switch Flow Chart and Lamp Flow Chart)	31
Chapter 3, • Go To Audits Menu (Overview)	33
◆ Game Audit Table	32
• GO TO AUDITS MENU	33
• Earnings Audits (Audits 01-14)	33
• Standard Audits (Audits 15-68)	34-35
• Feature Audits (Audits 69-172)	35-36
• Go To Printer Menu (Quick Printout, Full Printout and Reset Printer)	37
Chapter 4, • Go To Adjustments Menu (Overview)	39
◆ Game Adjustment Table	38
• GO TO ADJUSTMENTS MENU	39
• Standard Adjustments (Adjustments 01-46)	39-44
• Feature Adjustments (Adjustments 47-64)	44-45
• Custom Message (Direct Access to Adjustment 26)	46
Chapter 5, • Go To Installs Menu (Overview)	47
• GO TO INSTALLS MENU	47
• Install Extra Easy	47
• Install Easy	48
• Install Normal	48
• Install Hard	48
• Install Extra Hard	48
• Install 3-Ball	48
• Install 5-Ball	49
• \$.50 Tournament	49
• Free Play Tournament	49
• Install Home Play	49
• Film Star Reset	49
• Install Novelty	50
• Install Add-A-Ball	50
• Install Factory	50
Chapter 6, • Go To Reset Menu (Overview)	51
• GO TO RESET MENU	51
• Reset Coin Audits	51
• Reset Game Audits	51
• Reset High Scores	51
• Reset Credits	51
• Factory Reset	51
◆ Example	52
Chapter 7, • Go To Tournament Menu (Future Expansion)	53
• GO TO TOURNAMENT MENU (OPTIONAL USE ONLY)	53
◆ FUTURE EXPANSION. AT TIME OF PRINTING THIS MENU IS NON-OPERATIONAL	53-54



Service Switch Set (Red, Green & Black Buttons) Access & Use

The **Service Switch Set** provides access for **three (3) functions** available for your use. They are **Volume Menu**, **Service Credits Menu** and **Portals™ Service Menu**. All are accessed separately depending on which colored button (**Red**, **Green** or **Black**) is **pushed first**.



To access any of these **three (3) functions** you must first open the **Coin Door** (see pictorial above) with the Game in the **Attract Mode** (not already in any Function or Menu stated below).



Function 1, Volume Menu

Pushing the Red Button first, enters the **Volume Menu**. While in this Mode, to **DECREASE** the volume, hold down or depress the **Red "LEFT" Button** until desired the volume is achieved; to **INCREASE** the volume, hold down or depress the **Green "RIGHT" Button** until the desired volume is achieved.

Note: Pushing the **Left or Right Flipper Buttons** operates the same as the **Red or Green Buttons** of the Service Switch Set, while in this Volume Mode.

Set between **0** and **31**; **15** is the **Factory Default**. Once your adjustments are made, this menu will **automatically exit** a few seconds after the last button depression.



Function 2, Service Credits Menu

Pushing the Green Button first, adds **Service Credits** (will not affect your audits as "paid" credits). This is useful for the technician to test the game in regular play without affecting the game audits. Each depression adds **1 credit**; up to **50 credits** can be applied. **Adjustment 11, Credit Limit**, (Default = **30**) determines this, however, it can be changed from **04-50**; see Chapter 4 of this Section for details). Once your credits are added, this menu will **automatically exit** a few seconds after the last button depression.

Note: This function is disabled if **Adjustment 25, Free Play**, is set to **YES**. The **Service Credits** are limited to the **Credit Limit** in addition to any paid credits present in the game (e.g. If the **Credit Limit** is **30**, and there are **8 paid credits** present, only **22 Service Credits** can be applied.).



Function 3, Portals™ Service Menu

Pushing the Black Button first, enters the **Portals™ Service Menu**. Once in, move through the menus and sub-menus by pushing down or depressing the **Red "LEFT" or Green "RIGHT" Buttons**.

Note: Pushing the **Left or Right Flipper Buttons** operates the same as the **Red or Green Buttons** of the Service Switch Set, while in this Service Mode.

Select or activate the **Icon** chosen (the **Icon** will be "flashing") by pushing down or depressing the **Black "ENTER" Button**.

Note: Pushing the **Start Button** operates the same as the **Black Button** of the Service Switch Set, while in this Service Mode.

Please read the remainder of this Chapter for more information on the **Portals™ Service Menu**. The remaining six (6) Chapters of this Section explains all **Icons & Menus** in detail. **Read! Read! Read!**



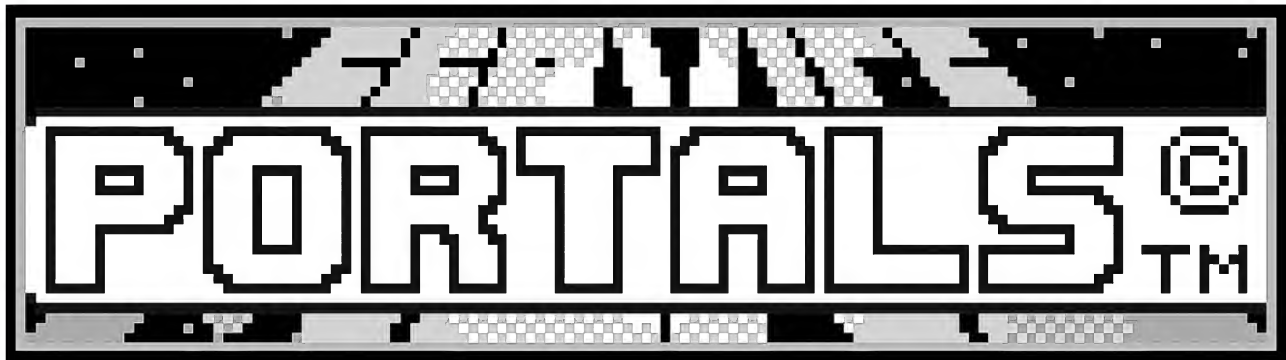
Portals™ Service Menu Introduction

Important: The **Dual Switch Bracket** holds the **Playfield Power Interlock & Memory Protect Switches**. It is located just inside the Coin Door frame (see pictorial of the **Coin Door** on the previous page). The Button Switch at the top is the **Playfield Power Interlock Switch**. It must be pulled out for electro-mechanical device testing or diagnostic purposes (this is required). If this button is pushed in, the **Playfield Power** is disabled while the **Coin Door** is **OPEN**. The Button Switch at the bottom is the **Memory Protect Switch**. It is enabled while the **Coin Door** is **CLOSED**; meaning any adjustment changes that are made **will not be written to memory**. If changing adjustments is required, ensure the **Coin Door** is **OPEN** to disable this switch, thus allowing for desired changes.

How to Use This Section

This section will cover all functions available in the **Portals™ Service Menu** in a *Step-By-Step* process. This section is divided into chapters which coincide with the **MAIN MENU**. The previous and following pages in this Chapter will instruct the operator on how to move through the Menus. It's simple, easy and fun to use!

To get into the **Service Menu Mode** review "**Function 3, Portals™ Service Menu**" on the previous page. After Power-Up, push down the **Black "BEGIN TEST" Button** to begin. Looking at the display you will momentarily see "**Service Menu**" with a satellite flying from right to left pulling a banner "**Portals©™**" followed by the **MAIN MENU**:



Use the **Red "LEFT" & Green "RIGHT" Buttons** (or **Left & Right Flipper Buttons**) to move the selected **Icon** left or right, and the **Black "ENTER" Button** (or **Start Button**) to activate the selected **Icon**. The use of the **Service Switch Set (Red, Green, & Black Buttons)** is required in **Switch Test** or **Active Switch Test**, as the **Start & Flipper Buttons** are a part of this test.

The **MAIN MENU** now appears with the "**DIAG**" **Icon** (**GO TO DIAGNOSTICS MENU**) flashing:



As the operator views the Menu Screen(s), the **MORE MORE** symbols indicates that there are more **Icons** to select in each direction. The **Icon** selected will blink. Pushing the **Black "ENTER" Button** (or **Start Button**) will select the **Icon** and the Menu Screen will change to the menu selected. Select the "**PREV**" **Icons** to move backwards through the menu levels. Select the "**QUIT**" **Icon** to completely exit the Service Mode.

View the **Portals™ Service Menu Icon Tree** on the next pages for a complete overview of all menus used in this system. The "**HELP**" **Icon** & "**?**" **Mini-Icon** provide explanation of **ICON** usage in the Menu where the "**HELP**" **Icon** or "**?**" **Mini-Icon** was selected. View **QUIT THIS SESSION (Exiting the Portals™ Service Menu)** at the end of this chapter (reference **Section 3, Chapter 1, Portals™ Service Menu Introduction**).

The **chapters** in this **section**, which coincide with the **MAIN MENU**, will also provide more detailed information. **Use both the manual and the display to help customize, troubleshoot and/or diagnose faults, if any.**

Portals™ Service Menu Icon Tree for **PLAYBOY** Pinball Game

Note: In Sub-Menu Tests or Displays, further action is required: select & activate the appropriate Mini-Icon(s).

Read the following chapters in this section:



Chp. 2



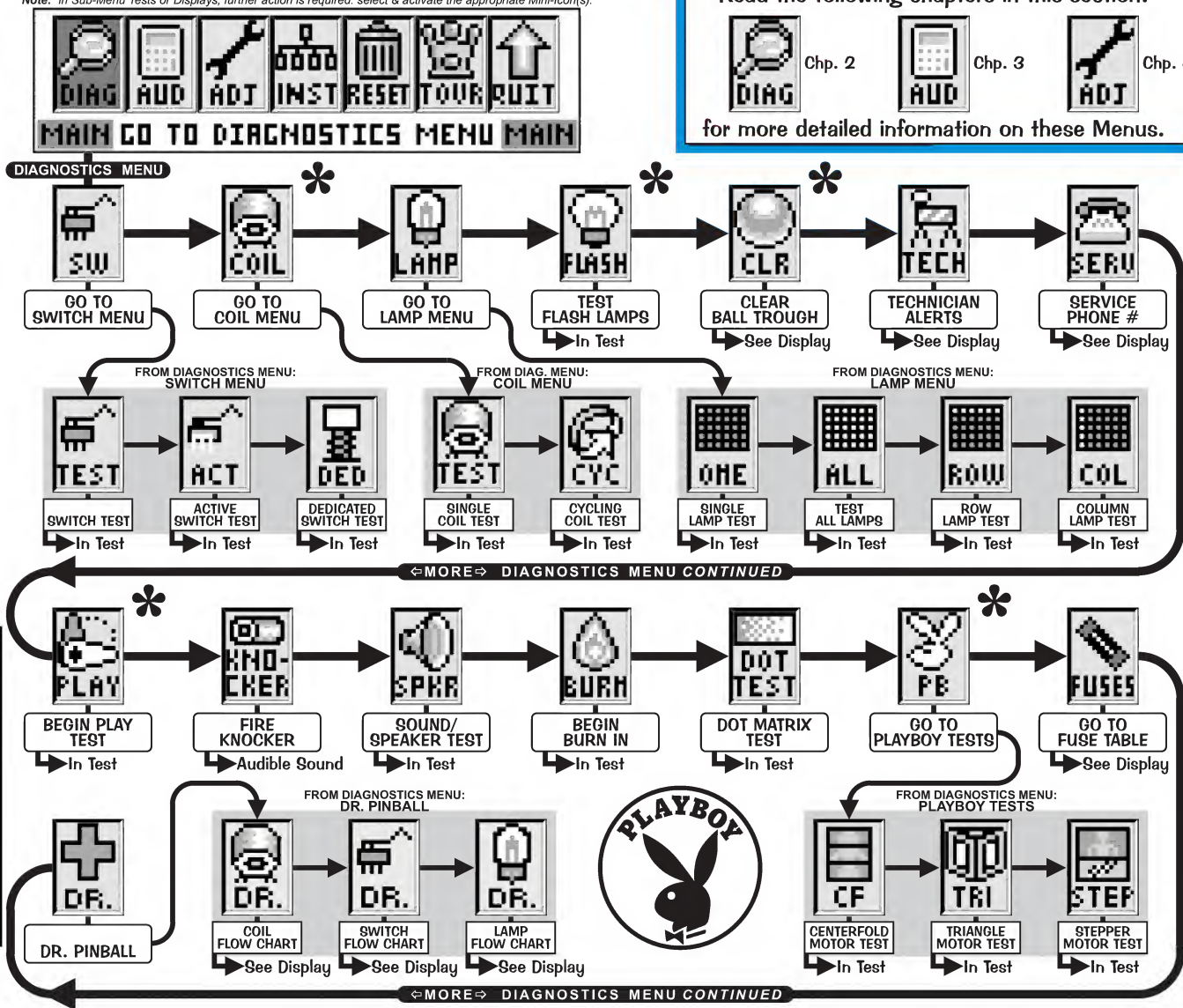
Chp. 3



Chp. 4

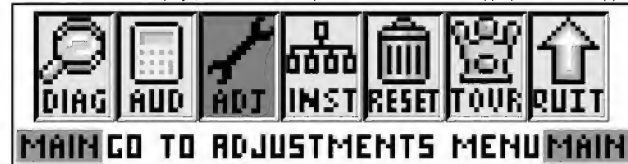
for more detailed information on these Menus.

Sec. 3: ...Menu Intro.



Note: In Sub-Menu Displays, further action is required: select & activate the appropriate Mini-Icon(s).

Note: In Sub-Menu Displays, further action is required: select & activate the appropriate Mini-Icon(s).



Note: Special equipment is required.

WHEN ENTERING THESE NOTED MENUS, YOU MUST PULL OUT the Power Interlock Switch for operation with the Coin Door open.

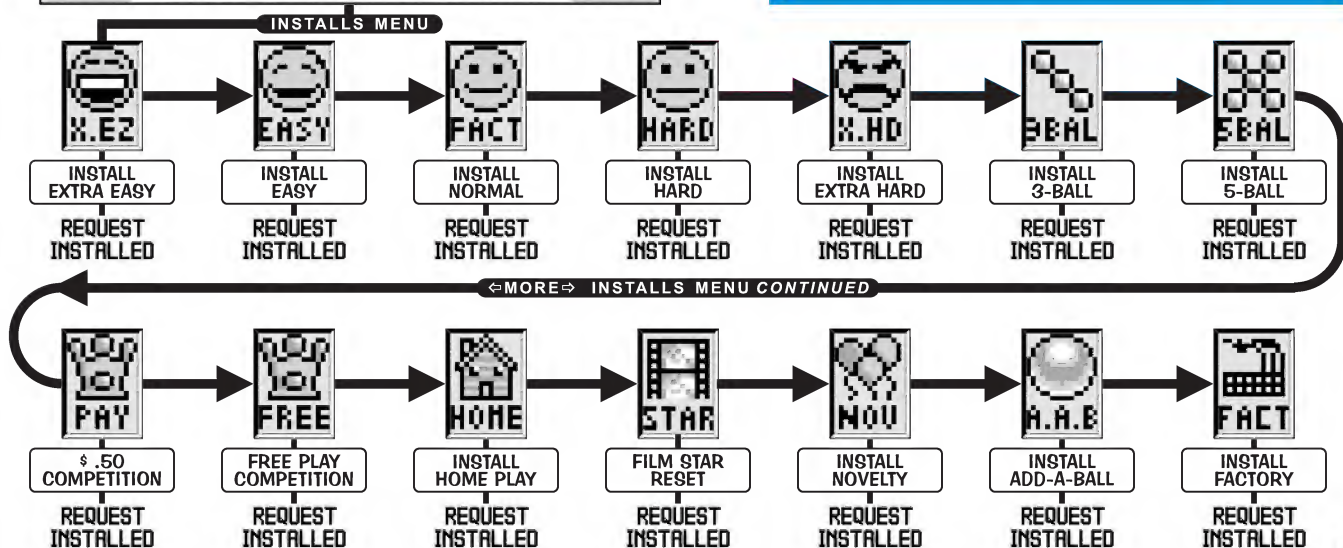


COIN DOOR IS OPEN
PLAYFIELD HIGH POWER
DISABLED BY
COIN DOOR INTERLOCK

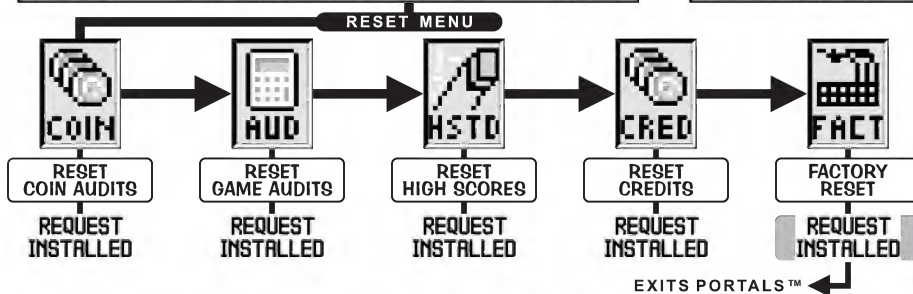


Portals™ Service Menu Icon Tree for **PLAYBOY** Pinball Game Continued

Note: After selection of any of the Install Icons, the request is installed and returns to the Install Menu. The last icon activated before exiting this menu will supercede any previous icon selected in the group.



Note: After selection of any of the 1st four Reset Icons, the request is installed and returns to the Reset Menu. Selecting the "FACT" icon, the request is installed and exits the Portals™ Service Menu System.



TOURNAMENT MENU FUTURE EXPANSION

Note: At time of printing, this Menu was not available. When this Menu becomes activated with updated Game Code or Special Tournament Game Code, look for a Manual Addendum and / or Service Bulletin outlining this feature (available through your Distributor when completed). This Menu will allow a simple method of setting up the game for Prize Tournaments. Optional equipment will be required.



EXITS PORTALS™

EXPLANATION & USAGE OF COMMON LARGE & MINI-ICONS USED IN VARIOUS MENUS & SUB-MENUS:



These **non-selectable** icons appear in the selected Menu only when there are MORE icons to the LEFT or to the RIGHT available for selection.



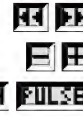
Select and activate to return to the PREVIOUS Menu.



Select and activate to QUIT, exits & returns to the Attract Mode.



Select and activate to view HELP Screens of the current Menu.



Select and activate to:
Move LEFT or RIGHT, select previous / next or move backwards / forwards.
DECREMENT (-) or INCREMENT (+) displayed value or select previous / next.



RUN (or activate) selected test or coil.
PULSE coil.



View the schematic (DRAWING) of current display. Select while current switch, lamp or coil is viewed.



Answer NO or YES for Flow Chart Menu questions in the Dr. Pinball Menus.



END current coil selection to select a new coil for diagnosing in the Dr. Pinball Menus.

Note: If a new MINI-ICON is used for a specific function, select the "?" icon for more information.

Portals™ Service Menu Example

This example will demonstrate activation of *Icons* in the **DIAGNOSTICS MENU**. The example will show activation of the "SW" *Icon* (**GO TO SWITCH MENU**). In this menu, the switches can be tested individually and also all active switches can be tested. Use the same technique to access all the *Icons* in the **Portals™ Service Menu**. Follow **Portals™ Service Menu Icon Tree** on the previous pages as a guide to help navigate through the entire system (Also, go to the chapter in this manual explaining the icon(s) selected.).

If the display is in any other menu other than the **MAIN MENU**, use the **Red "LEFT" & Green "RIGHT" Buttons** to select the "PREV" *Icon* and press the **Black "ENTER" Button** to *activate* the **ICON** thus moving back to the previous menu. Do so until **MAIN MENU** appears.

Chapters 2 through 7 will cover all menu items within the **Portals™ Service Menu**. The *Icon* is shown preceding the text. Find the *Icon* in the **Portals™ Service Menu** by navigating with the **Red or Green Buttons**. Each chapter started is from the **MAIN MENU**. Within the chapter, and Sub-Menu will be covered sequentially with their explanation & function. If the operator "*gets lost*", select and *activate* the "PREV" *Icon* until the display indicates **MAIN MENU**. For more help on Button Usage, select & *activate* the "HELP" *Icon* or "?" *Mini-Icons*.

EXPLANATION & USAGE OF COMMON LARGE & MINI-ICONS USED IN VARIOUS MENUS & SUB-MENUS:



These non-selectable *Icons* appear in the selected Menu only when there are MORE *Icons* to the LEFT or to the RIGHT available for selection.



Select and activate to return to the PREVIOUS Menu.



Select and activate to QUIT, exits & returns to the Attract Mode.



Select and activate to view HELP Screens of the current Menu*.



Select and activate to:
Move LEFT or RIGHT, select previous / next or move backwards / forwards.



DECREMENT (-) or INCREMENT (+) displayed value or select previous / next.



RUN (or activate) selected test or coil
PULSE coil.



View the schematic (DRAWING) of current display.
Select while current switch, lamp or coil is viewed.

* Help Note: An explanation of each Mini-Icon at that menu level will cycle continuously. To exit a display where no Mini-Icons are available for selection, pressing any button will exit the display.

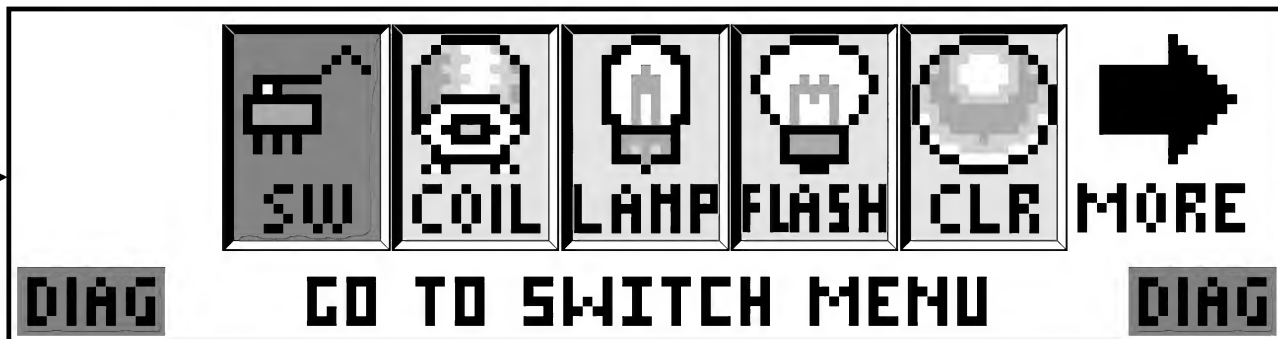
Sec. 3: ...Menu Intro.

Example:

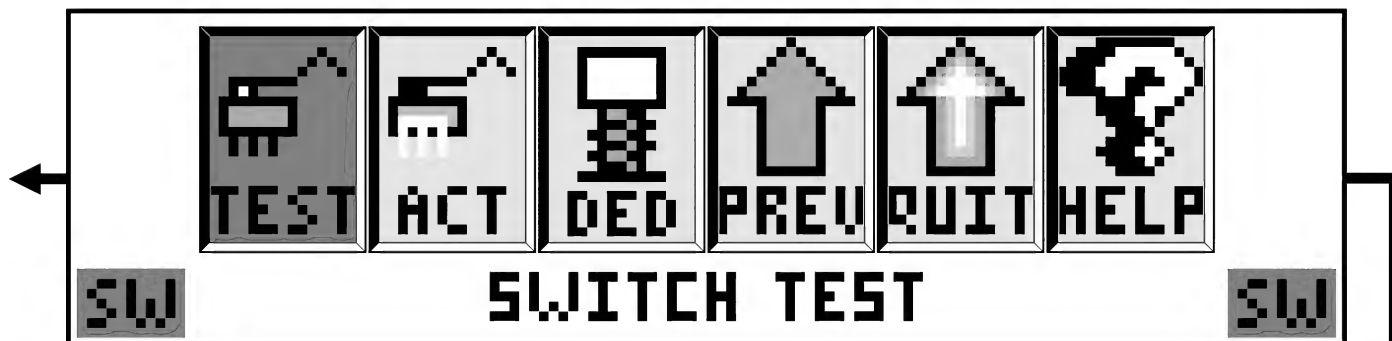
After entering **Portals™**, the **MAIN MENU** now appears with the "DIAG" *Icon* (**GO TO DIAGNOSTICS MENU**) flashing:



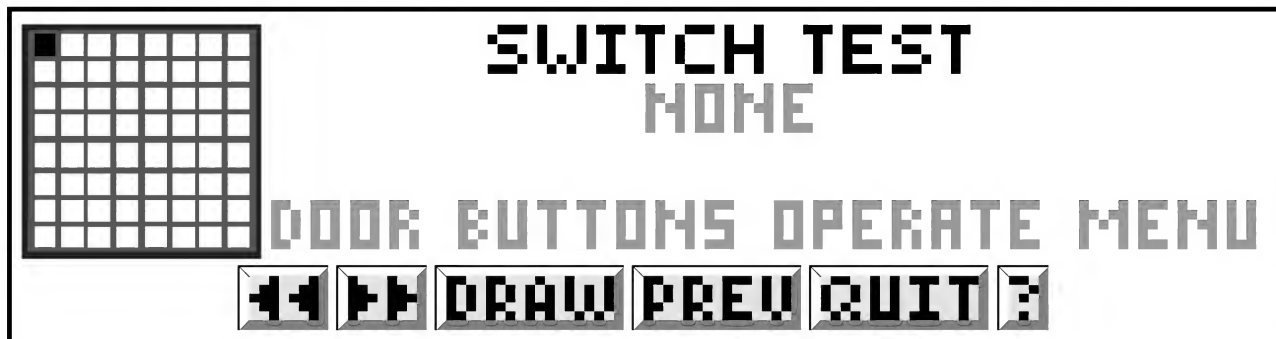
Press the **Black "ENTER" Button** to *activate* this **ICON**. The **DIAGNOSTICS MENU** now appears with the "SW" *Icon* (**GO TO SWITCH MENU**) flashing:



Press the **Black Button** to *activate* this **ICON**. The **SWITCH TEST MENU** now appears with the "TEST" *Icon* (**SWITCH TEST**) flashing:

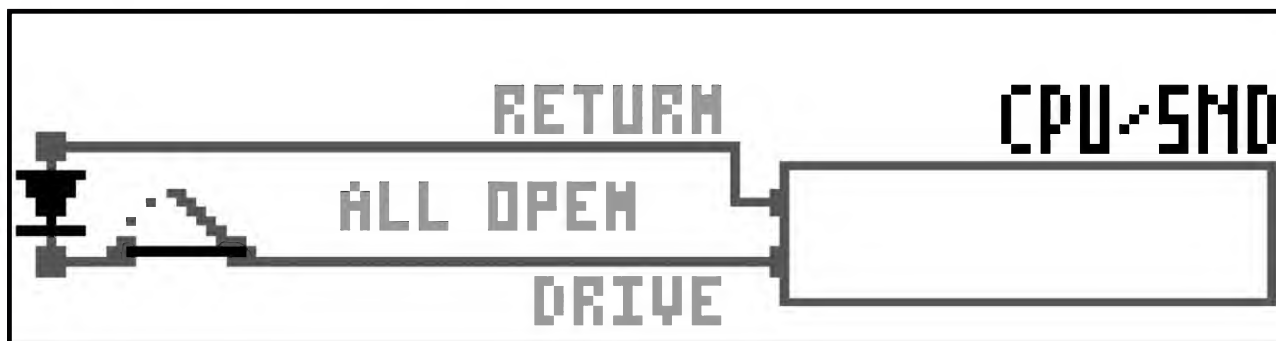


Press the **Black "ENTER" Button** to *activate* this icon. The **Switch Test Display** now appears.



All switches can be tested one at a time. When possible, use a pinball to close any playfield switches; rolling the ball at Stand-Up Targets or over/under switches is suggested. Use finger for all non-playfield switches. As each switch is closed, the respective Switch Matrix Grid Position (1-64) will be lit.

To view the schematic for the switch selected, press either the **Red** or **Green Button** to select the "DRAW" *Mini-Icon*. Press the **Black Button** to *activate* this *Mini-Icon*; do so while the switch is momentarily closed. This will bring up the **Switch Schematic Display**. The display describes the switch in the Switch Matrix which includes the name of the switch, the Return (Row) Wire and the Drive (Column) Wire, drive transistor, and the "Pin-Outs" from the CPU/Sound Board. *Activating* the "DRAW" *Icon* when a switch is not closed, will give the generic switch schematic as shown below.



To **exit any display where there are no Mini-Icons** (Schematics or Help Displays), **press any button** to return to the previous Menu.

While in **Switch Test** or **Active Switch Test**, the **Flipper & Start Buttons** are deactivated (because they can be part of these tests). Use the **Red "LEFT," Green "RIGHT"** and/or **Black "ENTER" Buttons** to select and *activate* the "**MINI-ICONS**" at the bottom of the display. In **Switch Test**, if the "<<" or ">>" *Mini-Icon* is *activated*, the display will go to (slip between) the previous tests (*Active & Dedicated Switch Tests*). Use either the **Red** or **Green Button** to select the "PREV" *Mini-Icon*. Press the **Black "ENTER" Button** to return to **Switch Test Menu**. To exit out of this Sub-Menu, select and *activate* the "PREV" *Icon* in the Menu. The **DIAGNOSTICS MENU** now appears with the "SW" *Icon* (**GO TO SWITCH MENU**) flashing. Go through other **Diagnostics** selections or exit.

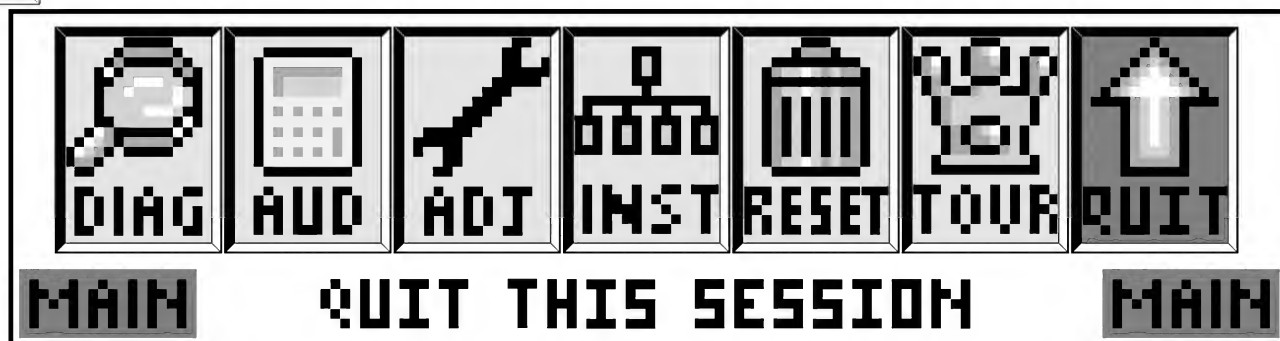
To exit the **Portals™ Service Menu**, select & *activate* the "QUIT" *Icon* (see the next page).

Sec. 3: ...Menu Intro.



QUIT THIS SESSION (Exiting the Portals™ Service Menu)

In the **MAIN MENU** and in all **SUB-MENUS**, if the "QUIT" *Icon* or "QUIT" *Mini-Icon* is selected and *activated*, the **Portals™ Service Menu Session** will be exited and returned to the **Attract Mode**.



The game will go into the same *Power-Up Routine* as if turning on the game. Upon **Power-Up**, the CPU Game Code & Display Code versions with Check-Sums are shown, followed by the Location ID & Game ID Numbers and Alerts, if any (see *Section 3, Chapter 2, GO TO DIAGNOSTICS MENU, Technician Alerts*).

The below **Problem / Solution Table** was designed to answer some common problems frequently asked.

Problem / Solution Table

PROBLEM	SOLUTION
Will not enter the Service Mode after depressing the Black "BEGIN TEST" Button .	• Check the Service Switch(es) (Red, Green & Black Buttons) for loose connections or bad Ground. • Check the associated wiring harness to/from the CPU/Sound Board, Connector CN6. • Check CPU/Sound Board for possible failure.
All Service Buttons (Red, Green and Black) appear nonfunctional.	• Check the Service Switches wiring harness for poor or no connection and/or broken wires.
The Green Service Button in the Attract Mode will not enter the SERVICE CREDITS MENU to add Service Credits.	• Check to make sure the Game is not in "Free Play." <i>If the game is set to Free Play, adding Service Credits is not required.</i> • Check the Service Switches wiring harness for poor or no connection and/or broken wires.
The Display "blanks out."	• Check the Dot Matrix Display for loose wiring harness for poor or no connection and/or broken wires. • Check F1 (3/4A Fuse) on the Display Power Supply Board. Refer to Sec. 5, Chp. 4, SCHEMATICS & TROUBLESHOOTING.
Icons " <i>scroll</i> " along continuously in the MAIN MENU .	• Check for a stuck switch on the Green Button. • If the Service Switch Set and/or the Coin Door was replaced, ensure the Locking Mechanism on the Green Button has this lock switch. Remove it. (Ref. to Svc. Bulletin #74.)
The Start and Flipper Buttons do not select or activate <i>Icons</i> in the SWITCH TEST MENU .	• This is normal. These switches are deactivated, as they are a part of the Switch Test. Use the Red "LEFT" or Green "RIGHT" & Black "ENTER" Buttons in this Sub-Menu. Refer to Section 3, Chapter 2, GO TO DIAGNOSTICS MENU, Switch Test.
Can't move selection of <i>Icon</i> with the Left and/or Right Flipper Buttons .	• Check the Flipper Buttons for loose connections or bad Ground and refer to Section 5, Chapter 2, Playfield Wiring, #-Flipper Circuit Wiring Diagram. • This is normal only in Diagnostic's Switch & Active Switch Tests (see <i>previous Problem</i>).
Some <i>Icons</i> appear non-functional in the PRINTER MENU(S) .	• If no printing equipment is connected, the "-" Icon, "+" Icon and "RUN" Icon will appear not to function. Refer Section 3, Chapter 3, GO TO PRINTER MENU.
Some <i>Icons</i> appear non-functional in the GAME SPECIFIC MENU under the DIAGNOSTICS MENU .	• If there is no other test under this Menu, the "<<" & ">>" Mini-Icons will appear not to function. The remaining <i>Icons</i> should function as normal. Note: <i>If there is no "Go To (Game Name) Test(s), the "GAME NAME" Icon will not invoke another display.</i>
The display returns to the ATTRACT MODE exiting the Service Session after a FACTORY RESET .	• This is normal. After a FACTORY RESET, the Service Session is automatically exited. Refer to Sec. 3, Chp. 6, GO TO RESET MENU, Factory Reset.
In COIL TEST MENU , the coils and flashlamps do not fire after activating the "RUN" Icon .	• Ensure the POWER INTERLOCK SWITCH is pulled out (see the start of this Chapter).
In ADJUSTMENTS MENU , with the Coin Door CLOSED , adjustments are not getting changed as desired (using the Flipper & Start Buttons).	• This is normal. The Memory Protect Switch is enabled when the Coin Door is CLOSED. Changes can be made with the Coin Door OPEN only.
In Portals™ Service Menu , the volume cannot be adjusted with the Red or Green Buttons .	• The Volume adjustment can only be made when in the Attract Mode. The Volume Mode is entered by pressing the Red "VOLUME" Button. Then use the Red "LEFT" to decrease / decrement (-) or Green "RIGHT" Button to increase / increment (+) the volume.
In Portals™ Service Menu , the display seems to lock up, or the Help Display appears to be non-functional.	• If you cannot clear the situation by exiting back one Menu, exit completely out of the Portals™ Service Menu, and re-enter. If the problem persists, call Technical Support for additional help.



Go To Diagnostics Menu

Overview

The **Portals™ Service Menu System** provides tests for sounds, display, lamps, switches and coils. Each feature may be tested manually or automatically after entering the **Portals™ Service Menu** (see Chapter 1 of this Section). The automatic tests (e.g. **Cycling Coils**, **Test Flash Lamps**) may be used for a quick verification of automatic test functions and the manual tests (**Begin Play Test**, **Single Lamp / All / Row / Column Tests**, and **'Game Name' Tests**) may be used for troubleshooting. All *Icons* and there usages are explained throughout this chapter in order.

Important: Upon **Power-up**, opening the **Coin Door** or exiting **Portals™**, watch the **Display** for any **Alerts**.

OPEN THE DOOR

Check battery voltage at **VBATT Test Point** on the **CPU/Sound Bd.** (more details in *Sec. 5, Chp. 4, PCBs*).

COIN DOOR IS OPEN
PLAYFIELD HIGH POWER
DISABLED BY
COIN DOOR INTERLOCK

This **flashing display** is shown immediately upon opening the **Coin Door** as a reminder that **20v/50v DC** power to the playfield is **disabled**. All electro-mechanical devices (such as **Coils**) **cannot be tested** with the switch pushed in. **PULL OUT** the **Power Interlock Switch** **ONLY** if you're in a **Testing Menu** requiring power. See **Access & Use** in Chapter 1 of this Section for the location of this switch. **Closing the Coin Door** will automatically reset this switch.

OPERATOR ALERT!
#2 AUTO LAUNCH
COIL MALFUNCTION

This **display** is shown momentarily during **Game Mode** or **Power-Up** to alert the operator of a coil malfunction (coil doesn't energize or coil fires a multiple number of times). **OPERATOR ALERT!** works by monitoring any switch activated coil that has the potential to trap a ball when disabled (more details in this Chapter, **Technician Alerts, Pages 24-25**).

PLEASE CHECK
TECH REPORT
PORTALS->DIAG->TECH

If this **display flashes** (along with an audible sound), the game has detected faulty switches and/or missing pinballs. To check, enter the **Portals™ Service Menu System**, select the **"DIAG" Icon** (**GO TO DIAGNOSTICS MENU**) from the **MAIN MENU** and select the **"TECH" Icon** (more details in this Chapter, **Technician Alerts, Pages 24-25**).

⚠ CAUTION: Remove pinballs from the Ball Trough prior to lifting the playfield for servicing. This can easily be done in the **Portals™ Service Menu System**. Select the **"DIAG" Icon** from the **MAIN MENU** to go to the **DIAGNOSTICS MENU**, then select the **"CLR" Icon** to enter the **CLEAR BALL TROUGH MENU**. Select the **"RUN" Mini-Icon** & press the **Start Button** to remove one ball at a time. This is also useful to retrieve one ball for game testing in **Begin Play Test** & **'Game Name' Tests**. **PULL OUT** the **Power Interlock Switch** for operation.

EXPLANATION & USAGE OF COMMON LARGE & MINI-ICONS USED IN VARIOUS MENUS & SUB-MENUS:



These **non-selectable Icons** appear in the selected Menu only when there are **MORE Icons** to the **LEFT** or to the **RIGHT** available for selection.



Select and activate to return to the **PREVIOUS Menu**.



Select and activate to **QUIT**, exits & returns to the **Attract Mode**.



Select and activate to view **HELP Screens** of the current Menu*.



Select and activate to:
Move **LEFT** or **RIGHT**, select previous / next or move backwards / forwards.



DECREMENT (-) or **INCREMENT (+)** displayed value or select previous / next.



RUN (or activate) selected test or coil **PULSE** coil.



View the schematic (**DRAWING**) of current display. Select while current switch, lamp or coil is viewed.

* **Help Note:** An explanation of each **Mini-Icon** at that menu level will cycle continuously. To exit a display where no **Mini-Icons** are available for selection, pressing any button will exit the display.



GO TO DIAGNOSTICS MENU

After entering **Portals™**, the **MAIN MENU** now appears. To initiate, from the **MAIN MENU**, select the **"DIAG" Icon** with either the **Red "LEFT"** or **Green "RIGHT" Buttons** (the **Flipper Buttons** operates in the same manner) and press the **Black "ENTER" Button** (the **Start Button** operates in the same manner). The **DIAGNOSTICS MENU** appears. Continue through this chapter for the explanation & usage of the *Icons* in the **DIAGNOSTICS MENU**. **Usage Note:** Only in **Switch & Active Switch Tests**, the **Flipper & Start Buttons** cannot be used as the alternate navigation buttons as they are a part of these tests. After exiting these tests, the **Left & Right Flipper** and **Start Buttons** can once again be used. Continue through this chapter for the explanation & usage of the *Icons* in the **DIAGNOSTICS MENU**.



Go To Switch Menu

To initiate, from the **DIAGNOSTICS MENU**, select the "SW" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. Switches are configured in an 8 x 8 Matrix of Columns (Switch Drives) and Rows (Switch Returns) with up to **64** possible switches. The **SWITCH TEST MENU** consists of three (3) parts: **Switch Test**, **Active Switches & Dedicated Switch Test**. **Reminder:** *The Flipper & Start Buttons (part of Switch Tests) cannot be used as navigation buttons during these test(s)*



Switch Test

To initiate, from the **SWITCH MENU**, select the "TEST" *Icon* with either the **Red** or **Green Buttons** & press the **Black Button**. In **Switch Test**, close each switch and observe the display. The display will describe the switch in the Switch Matrix, which includes the switch name, Return (Row) Wire, Drive (Column) Wire and the "Pin-Outs" from the **CPU/Sound Board**. When the switch is closed, the information is displayed momentarily. To view the schematic for the switch selected, press either the **Red** or **Green Button** to select the "DRAW" *Mini-Icon*. Press the **Black Button** to *activate* this *Mini-Icon*; do so while the switch is momentarily closed. To return to **Switch Test**, press the **Black Button** again.



Active Switch Test

To initiate, from the **SWITCH MENU**, select the "ACT" *Icon* with either the **Red** or **Green Buttons** & press the **Black Button**. If still in a previous test, select the "PREV" *Mini-Icon* to return to **SWITCH MENU** or select either of the "<<" or ">>" *Mini-Icons* to move through the tests. In **Active Switch Test**, if any switches are stuck closed (*or made from the presence of a pinball*), the display sequences through the Switch Names, Return (Row) Wire, Drive (Column) Wire, Drive Transistor, Part Number and the "Pin-Outs" from the **CPU/Sound Board**. This cycle continues until all switches are cleared or until the test is exited.



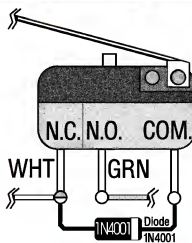
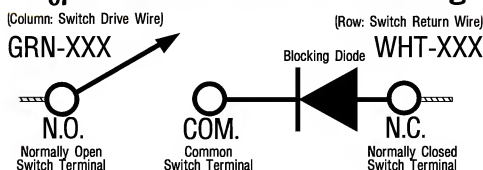
Dedicated Switch Test

To initiate, from the **SWITCH MENU**, select the "DED" *Icon* with either **Flipper Button** & press the **Start Button** (*the Service Switches are deactivated during this test.*). In **Dedicated Switch Test**, the display will describe the switch which includes the Switch Name, Return (Row) Wire, Drive (Column) Wire, Part Number and the "Pin-Outs" from the **CPU/Sound Board**.

SWITCH MATRIX GRID & DEDICATED SWITCHES

D i o d e O n T e r m i n a l S t r i p :											
Column (Drive)		1: Q1	2: Q2	3: Q3	4: Q4	5: Q5	6: Q6	7: Q7	8: Q8	GND	Ground
Row (Return)		GRN-BRN CN5-P1	GRN-RED CN5-P3	GRN-ORG CN5-P4	GRN-YEL CN5-P5	GRN-BLK CN5-P6	GRN-BLU CN5-P7	GRN-VIO CN5-P8	GRN-GRY CN5-P9	IC U206 INPUTS	BLK CN6-P1, -P11
1: U400	LEFT BUTTON (UK ONLY) on Cabinet side	SKILL SHOT Under Playfield	RIGHT RAMP ENTER On Ramp Assy.	POP BUMPER EXIT Under Playfield	SURPRISE PACKAGE TARGET On Assembly	LEFT RAMP ENTER On Ramp Assy.	LEFT BUMPER On Assembly	LEFT OUTLANE Under Playfield		1: U206 GRY-BRN CN6-P2	#1 LEFT FLIPPER BUTTON in Cabinet side D8-1
2: U400	4TH COIN SLOT On Coin Door	RIGHT ORBIT Under Playfield	RIGHT RAMP EXIT On Ramp Assy.	DROP TARGET On Assembly	GROTTO EJECT Under Playfield	LEFT RAMP EXIT On Ramp Assy.	RIGHT BUMPER On Assembly	LEFT RETURN LANE Under Playfield		2: U206 GRY-RED CN6-P3	#2 LEFT FLIPPER E.O.S (End-of-Stroke) in Cabinet side D8-2
3: U400	6TH COIN SLOT On Coin Door	4-BALL THROUGH #1 (LEFT) On Assembly	CENTER LANE Under Playfield	LEFT ORBIT Under Playfield	VUK On Assembly	CENTERFOLD 1 (CLOSED) On Assembly	BOTTOM BUMPER On Assembly	LEFT SLINGSHOT On Assembly		3: U206 GRY-ORG CN6-P4	#3 RIGHT FLIPPER BUTTON in Cabinet side D8-3
4: U400	RIGHT COIN SLOT On Coin Door	4-BALL TROUGH #2 On Assembly	NOT USED	NOT USED	NOT USED	CENTERFOLD 2 (OPEN) On Assembly	TEASE SCREW LIMIT On Assembly	RIGHT OUTLANE Under Playfield		4: U206 GRY-YEL CN6-P6	#4 RIGHT FLIPPER E.O.S (End-of-Stroke) in Cabinet side D8-4
5: U401	CENTER COIN SLOT / DBA On Coin Door	4-BALL TROUGH #3 On Assembly	CENTER RAMP EXIT On Ramp Assy.	TRIANGLE MECH 1 (RIGHT) On Assembly	NOT USED	NOT USED	TOURNAMENT BUTTON Cabinet Front	RIGHT RETURN LANE Under Playfield		5: U206 NOT USED GRY-GRN CN6-P7	#5 NOT USED D8-5
6: U401	LEFT COIN SLOT On Coin Door	4-BALL TROUGH VUK OPTO On Assembly	LEFT TOP LANE Under Playfield	TRIANGLE MECH 2 (LEFT) On Assembly	RAMP BALL LOCK 3 On Ramp Assy.	NOT USED	START BUTTON Cabinet Front	RIGHT SLINGSHOT On Assembly		6: U206 GRY-BLU CN6-P8	#6 VOLUME (RED BUTTON) (In Test: LEFT) on Coin Door D8-6
7: U401	5TH COIN SLOT On Coin Door	4-BALL STACKING OPTO On Assembly	MIDDLE TOP LANE Under Playfield	NOT USED	RAMP BALL LOCK 1 On Ramp Assy.	NOT USED	NOT USED	NOT USED		7: U206 GRY-VIO CN6-P9	#7 SERV. CRED. (GREEN BUTTON) (In Test: RIGHT) on Coin Door D8-7
8: U401	RIGHT BUTTON (UK ONLY) on Cabinet side	SHOOTER LANE Under Playfield	RIGHT TOP LANE Under Playfield	PEEK-A-BOO TARGET On Assembly	RAMP BALL LOCK 2 On Ramp Assy.	NOT USED	PLUMB BOB TILT Inside Cabinet	NOT USED		8: U206 GRY-BLK CN6-P10	#8 BEGIN TEST (BLACK BUTTON) (In Test: ENTER) on Coin Door D8-8

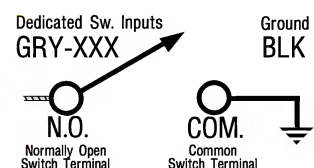
Typical Switch Schematic & Wiring



Note:
All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies.

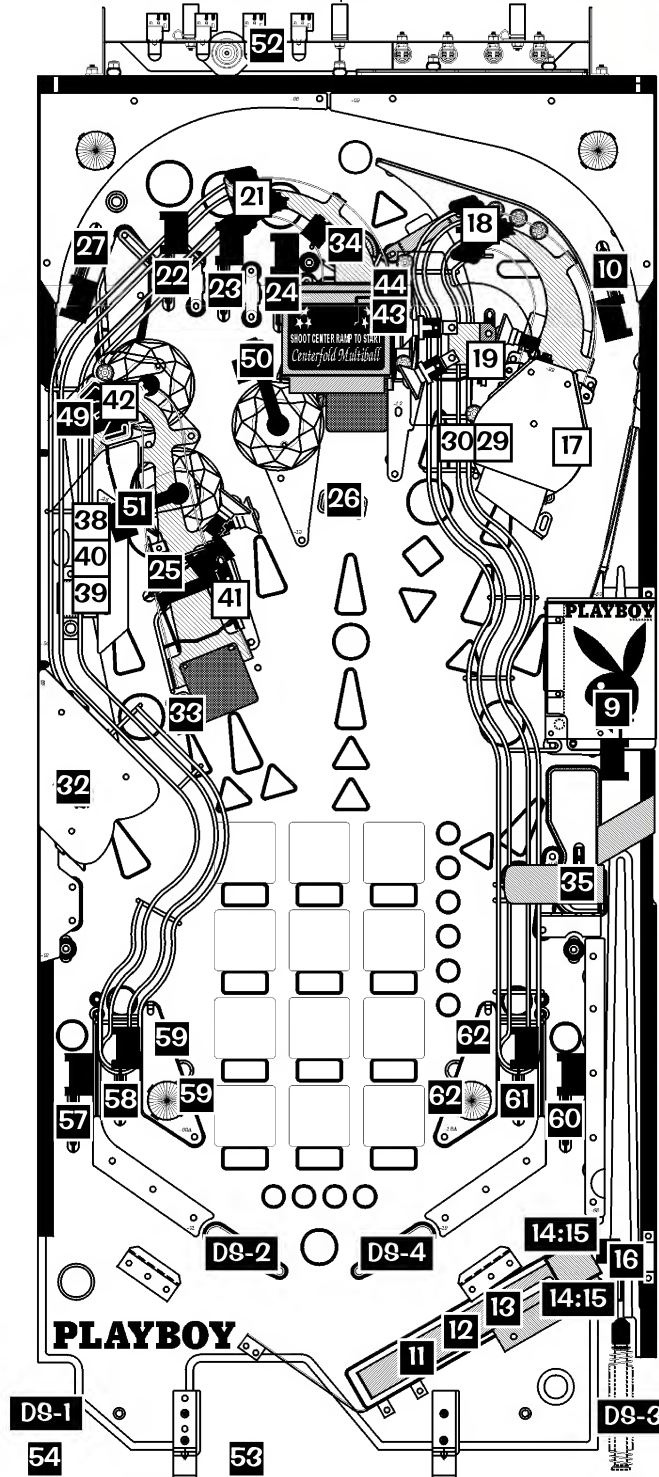
D i o d e O n T e r m i n a l S t r i p
or
D i o d e O n D i o d e B o a r d

Dedicated Switch Schem.



Switch Matrix Grid Descriptions with Part Numbers and Locations

The Switch locations correspond with the Switch N° in the Part Number Table shown & the Switch Matrix Grid (previous page).



Legend Note:

□ = Switches mounted above playfield.

■ = Switches mounted below playfield.

DOTS: Diode On Terminal Strip or **DODB:** Diode On Diode Board.

Note 1: Sw. 14 / Sw. 15 have both REC/TRANS on same board.

Note 2: For more details, see Sec. 4, Chp. 1, Playfield - Gen. Parts...

Note 3: Switch sold only with Bracket and/or Target.

Note 4: Switch Only. For entire Button Assembly, see Sec. 4, Chp. 1, Cabinet - General Parts & Switches.

Note 5: Switch located in/on Cabinet.

Note 6: Future Use.

Note 7: UK Only.

Sw. N°	Col. N°	Row N°	See Notes:	Switch Matrix Description		Part N°
Note: The ¥ Coin Switch (for Japan) is 180-5091-00						
1	1	1	5,7	LEFT BUTTON (UK ONLY)		180-5160-00
2	1	2	5	4TH COIN SLOT		180-5024-00
3	1	3	5,6	6TH COIN SLOT		(Future Use)
4	1	4	5	RIGHT COIN SLOT		180-5024-00
5	1	5	5	CENTER COIN SLOT / DBA		
6	1	6	5	LEFT COIN SLOT		
7	1	7	5,6	5TH COIN SLOT		
8	1	8	5,7	RIGHT BUTTON (UK ONLY)		180-5160-00
9	2	1		SKILL SHOT		500-6227-02
10	2	2		RIGHT ORBIT		
11	2	3		4-BALL TROUGH #1 (LEFT)		180-5119-02
12	2	4		4-BALL TROUGH #2		
13	2	5		4-BALL TROUGH #3		
14	2	6	1	4-BALL TROUGH VUK OPTO	BOT TRANS: BOT REC:	515-5173-00 515-5174-00
15	2	7	1	4-BALL STACKING OPTO	TOP TRANS: TOP REC:	515-5173-00 515-5174-00
16	2	8		SHOOTER LANE		180-5157-00
17	3	1		RIGHT RAMP ENTER		180-5190-28
18	3	2		RIGHT RAMP EXIT		180-5190-48
19	3	3		CENTER LANE		180-5190-28
20	3	4		NOT USED		
21	3	5		CENTER RAMP EXIT		180-5190-48
22	3	6	2,3	LEFT TOP LANE		500-6227-02
23	3	7	2,3	MIDDLE TOP LANE		
24	3	8	2,3	RIGHT TOP LANE		
25	4	1	2,3	POP BUMPER EXIT		
26	4	2	DOTS	DROP TARGET		180-5158-00
27	4	3	2,3	LEFT ORBIT		500-6227-01
28	4	4		NOT USED		
29	4	5		TRIANGLE MECH 1 (RIGHT)		180-5189-00
30	4	6		TRIANGLE MECH 2 (LEFT)		
31	4	7		NOT USED		
32	4	8	2,3	PEEK-A-BOO TARGET		500-6148-01
33	5	1	2,3	SURPRISE PACKAGE TARGET		515-5967-02
34	5	2		GROTTO EJECT		180-5186-00
35	5	3	DOTS	VUK		180-5116-01
36	5	4		NOT USED		
37	5	5		NOT USED		
38	5	6		RAMP BALL LOCK 3		180-5119-02
39	5	7		RAMP BALL LOCK 1		
40	5	8		RAMP BALL LOCK 2		
41	6	1		LEFT RAMP ENTER		180-5190-28
42	6	2		LEFT RAMP EXIT		180-5190-48
43	6	3		CENTERFOLD 1 (CLOSED)		180-5119-00
44	6	4		CENTERFOLD 2 (OPEN)		
45	6	5		NOT USED		
46	6	6		NOT USED		
47	6	7		NOT USED		
48	6	8		NOT USED		
49	7	4		LEFT BUMPER		180-5015-03
50	7	2		RIGHT BUMPER		
51	7	3		BOTTOM BUMPER		
52	7	4		TEASE SCREW LIMIT		180-5190-48
53	7	5	4,5	TOURNAMENT BUTTON	Switch Only	180-5174-00
54	7	6	4,5	START BUTTON	Switch Only	
55	7	7		NOT USED		
56	7	8	5	PLUMB BOB TILT	HANGER CONTACT	535-5319-00 535-7563-01
57	8	1	2,3	LEFT OUTLANE	on Rt. Mount R/O	500-6227-02
58	8	2	2,3	LEFT RETURN LANE	on Rt. Mount R/O	
59	8	3	2	LEFT SLINGSHOT	Leaf Sw. X2	180-5054-00
60	8	4	2,3	RIGHT OUTLANE	on Rt. Mount R/O	500-6227-02
61	8	5	2,3	RIGHT RETURN LANE	on Rt. Mount R/O	
62	8	6	2	RIGHT SLINGSHOT	Leaf Sw. X2	180-5054-00
63	8	7		NOT USED		
64	8	8		NOT USED		

DS: Dedicated Switches descriptions on previous page.



Go To Coil Menu

To initiate, from the **DIAGNOSTICS MENU**, select the "COIL" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. The coils are listed in groups. Coils **01-16** are typically High Current Coils (*although Low Current Coils may be used in these positions & will be noted*). Coils **17-32** are typically Low Current Coils. Flash Lamps are typically used in positions **26-32** (*although may be used in any position & will be noted*).

COIN DOOR IS OPEN
PLAYFIELD HIGH POWER
DISABLED BY
COIN DOOR INTERLOCK

PULL OUT the Power Interlock Switch
for operation with the Coin Door open.

Important: For more on troubleshooting & diagnosing, see Section 5, Chapter 4, **Printed Circuit Boards**.



Single Coil Test

To initiate, from the **COIL MENU**, select the "TEST" *Icon* with either the **Red** or **Green Buttons** and press the **Black Button**. Ensure the **Power Interlock Switch** is pulled out. Select either the "-" or "+" *Mini-Icons*. Start with the "+" *Mini-Icon* to start the manual **Single Coil Test** from #1 (*the test runs through all Coils and Flash Lamps #1-#32 & Optional UK Only Auxilliary Positions AUX 1-3*). Press the **Black Button** on the "+" *Mini-Icon*, as each coil is selected, the display will describe the Coil or Flash Lamp Name with the corresponding number, the wire with colors, the "Pin-Outs" from the I/O Power Driver Board, the Coil Voltage and Gauge-Turns (e.g. 23-800). Press the **Black Button** again to move forward in the test. To test and view a particular Coil or Flash Lamp, select the "RUN" *Mini-Icon* and press the **Black Button**. Each time the **Black Button** is pushed, the Coil or Flash Lamp will fire on the Playfield and/or Backbox, with the display indicating the Coil or Flash Lamp information. Continue with the same procedure to run through the entire test.



Cycling Coil Test

To initiate, from the **COIL MENU**, select the "CYC" *Icon* with either the **Red** or **Green Buttons** and press the **Black Button**. If still in a previous test, select the "PREV" *Mini-Icon* to return to **COIL MENU** or select either of the "<<" or ">>" *Mini-Icons* to move to **Cycling Coil Test** (*selecting again will return to Coil Test*). The test pulses each regular Coil or Flash Lamp sequentially (*cycling*) on the Playfield and in the Backbox (*if Coils are used*). The display indicates **CYCLING COILS**.

Coil & Flash Lamp Descriptions

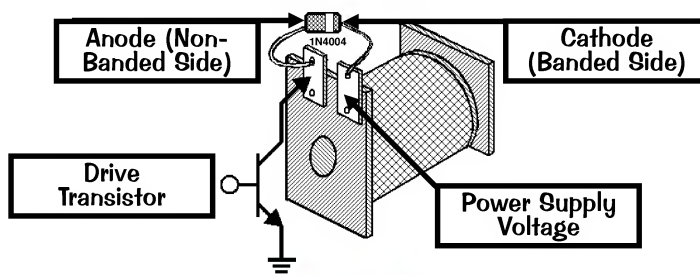
#	Type	Coil / Flash Lamp Descriptions
1	Coil	TROUGH UP-KICKER (VUK) (26-1200)
2	Coil	AUTO LAUNCH (23-700)
3	Coil	BALL LOCK POST (27-1500)
4	Coil	LEFT ORBIT POST (26-1200)
5	Coil	DROP TARGET (27-1500)
6	Coil	CENTER LANE POST (26-1200)
7	Coil	BEAD SCREEN LEFT (26-1200)
8	Coil	BEAD SCREEN RIGHT (26-1200)
9	Coil	LEFT BUMPER (26-1200)
10	Coil	RIGHT BUMPER (26-1200)
11	Coil	BOTTOM BUMPER (26-1200)
12	Coil	GROTTO EJECT (26-1200)
13	Coil	VUK (26-1200)
14	Coil	MAGAZINE POST (24-940)
15	Coil	LEFT FLIPPER [50V RED/YEL] (23-1100)
16	Coil	RIGHT FLIPPER [50V RED/YEL] (23-1100)

#	Type	Coil / Flash Lamp Descriptions
17	Coil	LEFT SLINGSHOT (23-800)
18	Coil	RIGHT SLINGSHOT (23-800)
19	Coil	DROP SCREEN STEPPER #1 (Stepper Motor)
20	Coil	DROP SCREEN STEPPER #2 (Stepper Motor)
21	Coil	DROP SCREEN STEPPER #3 (Stepper Motor)
22	Coil	TRIANGLE BILLBOARD (Relay Board)
23	Coil	DROP SCREEN STEPPER #4 (Stepper Motor)
24	Coil	(OPTIONAL COIN METER)
25	Flash	FLASH: TRIANGLE X1 (#89 Bulb)
26	Flash	FLASH: MIRROR X4 (#906 Bulb)
27	Flash	FLASH: BACK LT X1 BACK RT X1 (#906 Bulb)
28	Flash	FLASH: LT SLINGSHOT X1 (#906 Bulb)
29	Flash	FLASH: RT SLINGSHOT X1 (#906 Bulb)
30	Coil	FLASH: TRIPLE JACKPOT X1 (#89 Bulb)
31	Coil	CENTERFOLD ON/OFF (DC Relay Board)
32	Coil	CENTERFOLD OPEN/CLOSE (DC Relay Bd.)

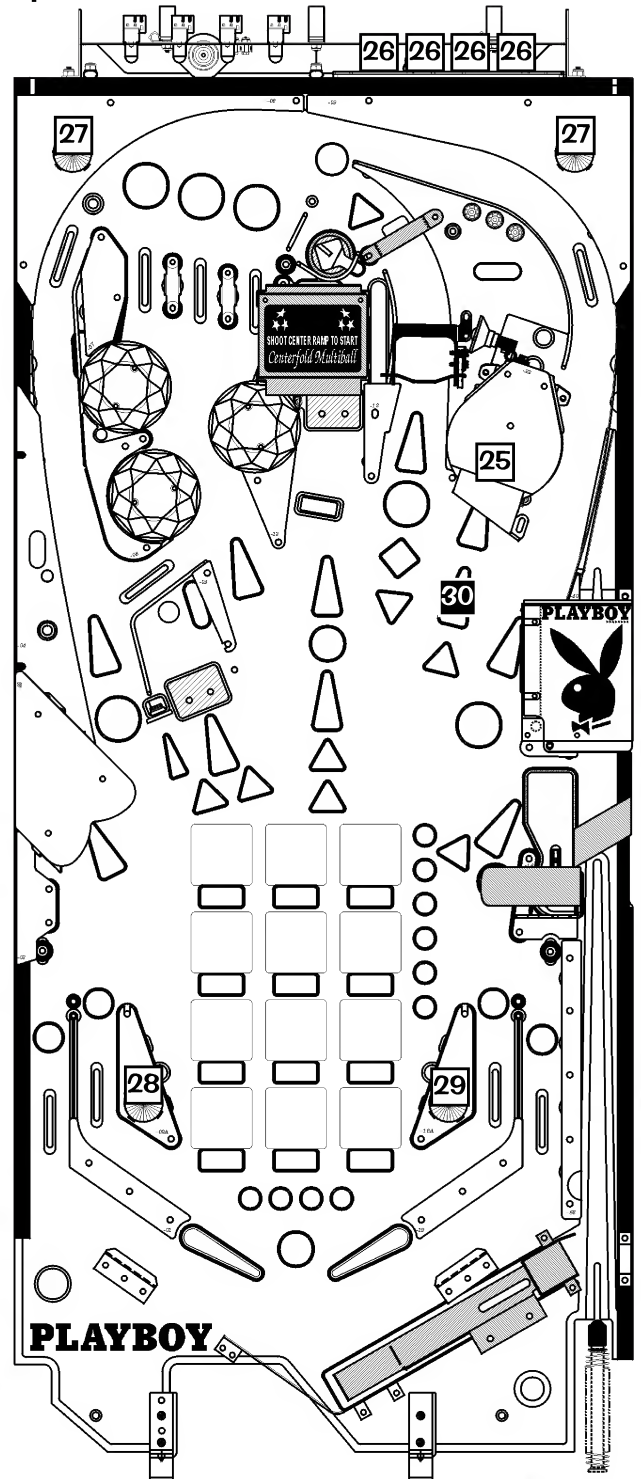
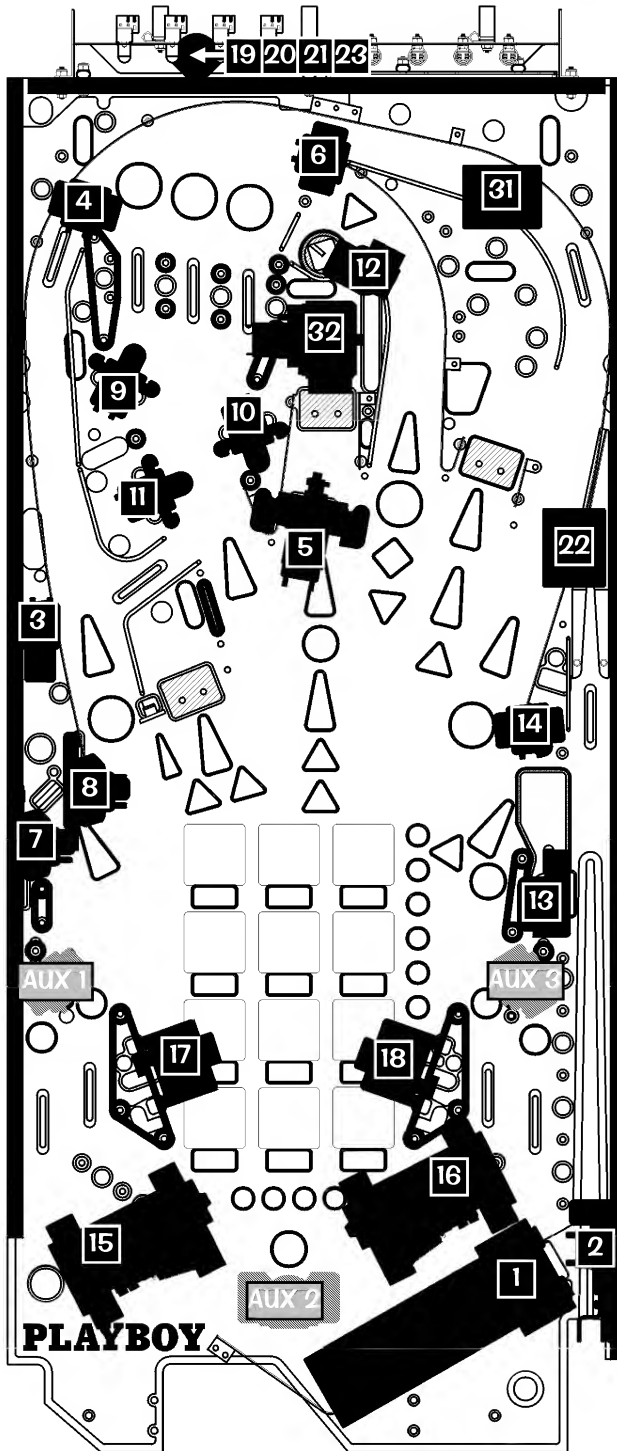
See the next three (3) pages for the **Coil & Flash Lamp Location Maps** (corresponds to above tables), **Coils Detailed Chart Table** & the **Backbox I/O Power Driver Board Detailed Wiring Diagram**.

Note: All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies. D iode Q n T erminal S trip or D iode Q n D iode B oard

Typical Coil Wiring



Coil & Flash Lamp Locations



Sec. 3: ... Diagnostics

Use the previous page and the following two (2) pages in conjunction with above **Coil** and **Flash Lamp** Maps.

Legend Note:

- ☐ = Coils and Flash Lamps mounted above playfield.
- ☒ = Coils and Flash Lamps mounted below playfield.

The following Bulb Types are used for Flash Lamps:



#89 Bulb
(Bayonet)
165-5000-89



#906 Bulb
(Wedge Base)
165-5004-00

The following Coil is optional:

24

The following Coils are for **UK Only**:

Aux. 1 **Aux. 2** **Aux. 3**

All Coil Positions are used.

Go To
Diagnostics Menu

PLAYBOY

Section 3, Chapter 2
Page 19



In COIL MENU
also select:

CYCLING
COIL
TEST

COILS DETAILED CHART TABLE

High Current Coils Group 1		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn or Bulb Type
#1	TROUGH UP-KICKER	Q1	I/O Pwr. Drvr.	BRN-BLK	J8-P1	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#2	AUTO LAUNCH	Q2	I/O Pwr. Drvr.	BRN-RED	J8-P3	YEL-VIO	J10-P4/5	50v DC	23-700 090-5022-00T
#3	BALL LOCK POST	Q3	I/O Pwr. Drvr.	BRN-ORG	J8-P4	BRN	J7-P1	20v DC	27-1500 090-5004-00T
#4	LEFT ORBIT POST	Q4	I/O Pwr. Drvr.	BRN-YEL	J8-P5	BRN	J7-P1	20v DC	26-1200 090-5044-00T
#5	DROP TARGET	Q5	I/O Pwr. Drvr.	BRN-GRN	J8-P6	YEL-VIO	J10-P4/5	50v DC	27-1500 090-5004-00B
#6	CENTER LANE POST	Q6	I/O Pwr. Drvr.	BRN-BLU	J8-P7	BRN	J7-P1	20v DC	26-1200 090-5044-00T
#7	BEAD SCREEN LEFT	Q7	I/O Pwr. Drvr.	BRN-VIO	J8-P8	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#8	BEAD SCREEN RIGHT	Q8	I/O Pwr. Drvr.	BRN-GRY	J8-P9	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T

High Current Coils Group 2		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn
#9	LEFT BUMPER	Q9	I/O Pwr. Drvr.	BLU-BRN	J9-P1	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#10	RIGHT BUMPER	Q10	I/O Pwr. Drvr.	BLU-RED	J9-P2	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#11	BOTTOM BUMPER	Q11	I/O Pwr. Drvr.	BLU-ORG	J9-P4	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#12	GROTTO EJECT	Q12	I/O Pwr. Drvr.	BLU-YEL	J9-P5	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#13	VUK	Q13	I/O Pwr. Drvr.	BLU-GRN	J9-P6	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#14	MAGAZINE POST	Q14	I/O Pwr. Drvr.	BLU-BLK	J9-P7	BRN	J7-P1	20v DC	24-940 090-5036-00B
#15	LEFT FLIPPER (50v RED/YEL)	Q15	I/O Pwr. Drvr.	ORG-GRY	J9-P8	RED-YEL GRY-YEL	J10-P1/2	50v DC	23-1100 090-5030-00T
#16	RIGHT FLIPPER (50v RED/YEL)	Q16	I/O Pwr. Drvr.	ORG-VIO	J9-P9	RED-YEL BLU-YEL	J10-P1/2	50v DC	23-1100 090-5030-00T

Low Current Coils Group 1		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn or Meter #
#17	LEFT SLINGSHOT	Q17	I/O Pwr. Drvr.	VIO-BRN	J7-P2	BRN	J7-P1	20v DC	23-800 090-5001-00T
#18	RIGHT SLINGSHOT	Q18	I/O Pwr. Drvr.	VIO-RED	J7-P3	BRN	J7-P1	20v DC	23-800 090-5001-00T
#19	DROP SCREEN STEPPER #1	Q19	I/O Pwr. Drvr.	RED	J7-P4	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#20	DROP SCREEN STEPPER #2	Q20	I/O Pwr. Drvr.	GRN	J7-P6	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#21	DROP SCREEN STEPPER #3	Q21	I/O Pwr. Drvr.	BLK	J7-P7	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#22	TRIANGLE BILLBOARD	Q22	I/O Pwr. Drvr.	VIO-BLU	J7-P8	BRN	J7-P1	20v DC	Relay Bd. 520-5010-00
#23	DROP SCREEN STEPPER #4	Q23	I/O Pwr. Drvr.	BLU	J7-P9	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#24	OPTIONAL COIN METER	Q24	I/O Pwr. Drvr.	VIO-GRY	J7-P10	RED	J16-P7	5v DC	Meter 5v 091-5000-00

Diode On Terminal Strip (if noted)

Low Current Coils Group 2		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Bulb Type
#25	FLASH: TRIANGLE X1	Q25	I/O Pwr. Drvr.	BLK-BRN	J6-P1	ORG	J6-P10	20v DC	#89 Bulb 165-5000-89
#26	FLASH: MIRROR X4	Q26	I/O Pwr. Drvr.	BLK-RED	J6-P2	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#27	FLASH: BACK LT X1 BACK RT X1	Q27	I/O Pwr. Drvr.	BLK-ORG	J6-P3	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#28	FLASH: LT SLINGSHOT X1	Q28	I/O Pwr. Drvr.	BLK-YEL	J6-P4	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#29	FLASH: RT SLINGSHOT X1	Q29	I/O Pwr. Drvr.	BLK-GRN	J6-P5	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#30	FLASH: TRIPLE JACPOX X1	Q30	I/O Pwr. Drvr.	BLK-BLU	J6-P6	ORG	J6-P10	20v DC	#89 Bulb 165-5000-89
#31	CENTERFOLD ON/OFF	Q31	I/O Pwr. Drvr.	BLK-VIO	J6-P7	BRN	J7-P1	20v DC	DC Relay 520-5066-00
#32	CENTERFOLD OPEN/CLOSE	Q32	I/O Pwr. Drvr.	BLK-GRY	J6-P8	BRN	J7-P1	20v DC	(Motor) 041-5075-04

Note: In Test Flash Lamps Menu ("Flash" Icon), Flashers tested are all Flash Lamps located between Q1-Q32 (This Game: Q25-Q30)

Auxilliary (UK ONLY)	Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn
AUX 1: LEFT UP/DOWN POST	Q1	Sol. Expander (Aux. Board)	WHT	CN2-P5	BRN	J7-P1	20v DC	26-1200 090-5044-00T
AUX 2: CENTER UP/DOWN POST	Q2	Sol. Expander (Aux. Board)	RED	CN2-P4	BRN	J7-P1	20v DC	23-1100 090-5030-00T
AUX 3: RIGHT UP/DOWN POST	Q3	Sol. Expander (Aux. Board)	ORG	CN2-P3	BRN	J7-P1	20v DC	26-1200 090-5044-00T

Sec. 3: ... Diagnostics



Section 3, Chapter 2
Page 21



Go To Lamp Menu

To initiate, from the **DIAGNOSTICS MENU**, select the "LAMP" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. Controlled lamps are configured in an 8 x 10 Matrix of Columns (Lamp Drives) and Rows (Lamp Returns) with up to **80 lamps** possible. The Lamp Test Menu consists of four (4) parts: **Single Lamp Test**, **Test All Lamps**, **Row Lamp Test** & **Column Lamp Test**.



Single Lamp Test

To initiate, from the **LAMP MENU**, select the "ONE" *Icon* with either the **Red or Green Buttons** and press the **Black Button**. Select either the "-" or "+" *Mini-Icons*. Start with the "+" *Mini-Icon* to start the manual **Single Lamp Test** from Column 1, Row 1, Lamp 1. Press the **Black Button** on the "+" *Mini-Icon*, as each lamp is selected, the lamp will light at its location on the playfield as well as the display, indicating the Lamp Matrix Grid Position, lamp name with the corresponding number, Return (Row) Wire & Color, Drive (Column) Wire & Color, and associated drive transistors. Press the **Black Button** again to move forward in the test. To test and view a particular lamp, select the "RUN" *Mini-Icon* and press the **Black Button**. Each time the **Black Button** is pushed, the lamp will light-up on the playfield, with the display indicating the lamp information. *Continue with the same procedure to run through the entire test.*



Test All Lamps

To initiate, from the **LAMP MENU**, select the "ALL" *Icon* with either the **Red or Green Buttons** and press the **Black Button**. If still in **Single Lamp Test** (or any 1 of the 4 tests), select the "PREV" *Mini-Icon* to return to **LAMP MENU** or select either of the "<<" or ">>" *Mini-Icons* to move through the tests, keep activating until **Test All Lamps** is displayed. The display will indicate **ALL LAMPS ON** and the lamps on the playfield will be lit, alternating between the rows in the Lamp Matrix Grid.



Row & Column Lamp Tests

To initiate, from the **LAMP MENU**, select the "ROW" or "COL" *Icon* with either the **Red or Green Buttons** and press the **Black Button**. If still in a previous test, select the "PREV" *Mini-Icon* to return to **LAMP MENU** or select either of the "<<" or ">>" *Mini-Icons* to move through the tests, keep activating until **Row** or **Column Lamp Test** (whichever desired) is displayed. In this test, each set of lamps in each Row or Column of the Lamp Matrix Grid (respective to each test) will light-up on the playfield and is indicated in the display.



LAMP MATRIX GRID

D iode O n T ermi n a l S tri p :

Column (18v)	1: UI7	2: UI6	3: UI5	4: UI4	5: UI3	6: UI2	7: UI1	8: UI0
Row (GND)	YEL-BRN J13-P9	YEL-RED J13-P8	YEL-ORG J13-P7	YEL-BLK J13-P6	YEL-GRN J13-P5	YEL-BLU J13-P4	YEL-VIO J13-P3	YEL-GRY J13-P1
1: Q33	JANUARY #555 Bulb	FEBRUARY #555 Bulb	MARCH #555 Bulb	MANSION 1 (LT) #555 Bulb	MANSION 2 #555 Bulb	MANSION 3 #555 Bulb	MANSION 4 (RT) #44 Bulb	SHOOT AGAIN #555 Bulb
2: Q34	APRIL #555 Bulb	MAY #555 Bulb	JUNE #555 Bulb	LEFT OUTLANE #555 Bulb	LEFT RETURN LANE #555 Bulb	RIGHT RETURN LANE #555 Bulb	RIGHT OUTLANE #555 Bulb	PEEK-A-BOO #555 Bulb
3: Q35	JULY #555 Bulb	AUGUST #555 Bulb	SEPTEMBER #555 Bulb	PHOTO SHOOT (LT ORBIT) #555 Bulb	BUNNY (LT ORBIT) #555 Bulb	PHOTO SHOOT (LT RAMP) #555 Bulb	SPLASH (LT RAMP) #555 Bulb	JACKPOT (LT RAMP) #555 Bulb
4: Q36	OCTOBER #555 Bulb	NOVEMBER #555 Bulb	DECEMBER #555 Bulb	SURPRISE PACKAGE #555 Bulb	TEASE #555 Bulb	DROP TARGET #555 Bulb	MULTIBALL #555 Bulb	PAJAMA PARTY MULTIBALL #555 Bulb
5: Q37	BUNNY #1 (BOTTOM) #555 Bulb	BUNNY #2 #555 Bulb	BUNNY #3 #555 Bulb	BUNNY #4 #555 Bulb	BUNNY #5 #555 Bulb	BUNNY #10 #555 Bulb	NOT USED	LEFT TOP LANE #555 Bulb
6: Q38	MIDDLE TOP LANE #555 Bulb	RIGHT TOP LANE #555 Bulb	PHOTO SHOOT (CENTER) #555 Bulb	EXTRA BALL #555 Bulb	GROTTO ARROW #555 Bulb	PAJAMA PARTY HURRY-UP #555 Bulb	MYSTERY #555 Bulb	PHOTO SHOOT (RT RAMP) #555 Bulb
7: Q39	NOT USED	SPLASH (RT RAMP) #555 Bulb	PHOTO SHOOT (RT ORBIT) #555 Bulb	BUNNY (RT ORBIT) #555 Bulb	PHOTO SHOOT (VUK) #555 Bulb	JACKPOT HURRY-UP #555 Bulb	SPECIAL #555 Bulb	MAGAZINE 1 & 2 #555 Bulb
8: Q40	MAGAZINE 3 & 4 #555 Bulb	DOUBLE JACKPOT #555 Bulb	JACKPOT #555 Bulb	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
9: Q41	NOT USED	NOT USED	PEEK-A-BOO 1 & 2 #555 Bulb	PEEK-A-BOO 3 #555 Bulb	PEEK-A-BOO 4 #555 Bulb	CTRFOLD SPOTLITE (RT #1) #555 Bulb	CTRFOLD SPOTLITE (RT #2) #555 Bulb	START BUTTON #555 Bulb
10: Q42	CTRFOLD SPOTLITE (LT #2) #555 Bulb	STRIP POKER (LT RAMP) #555 Bulb	COLLECT PLAY-MATES #555 Bulb	CTRFOLD SPOTLITE (LT #1) #555 Bulb	CTRFOLD SPOTLITE (RT #3) #555 Bulb	LEFT BUMPER #555 Bulb	RIGHT & BOTTOM BUMPERS #555 Bulb	TOURNAMENT BUTTON #555 Bulb



Lamp Matrix Grid Locations

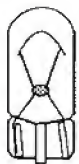
The lamp locations correspond with the Lamp N° in the Lamp Matrix Grid on the previous page.

Legend Note:

□ = Lamps mounted above playfield.

■ = Lamps mounted below playfield.

The following Bulbs are used in the Lamp Matrix Grid (See Table Grid on previous page for details):

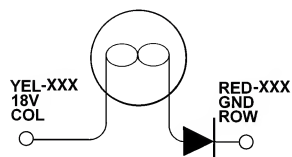


#555 Bulb
(Wedge)
165-5002-00

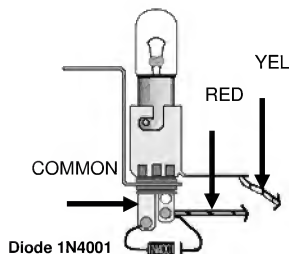


#44 Bulb
(Bayonet)
165-5000-44

Typical Lamp Schematic

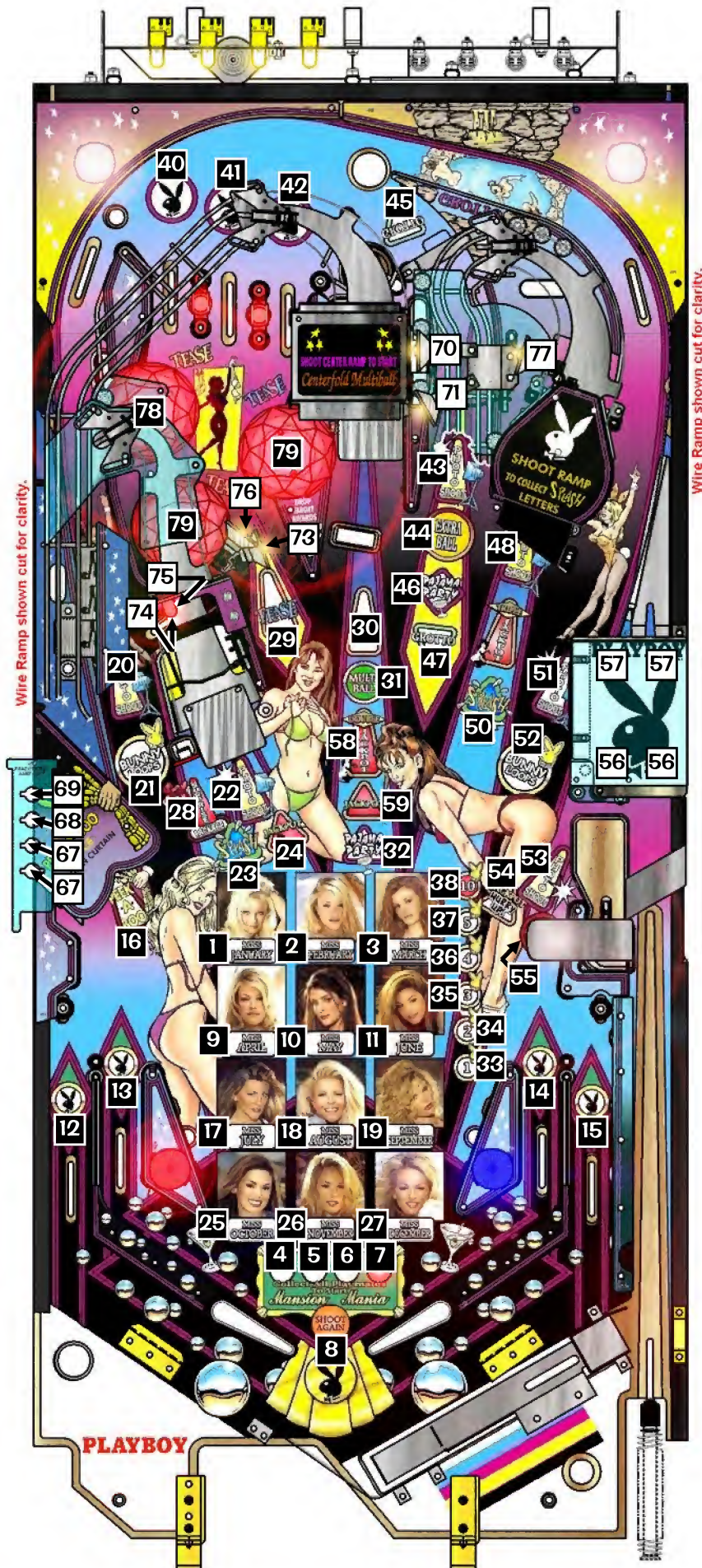


Typical Lamp Wiring



Note:

All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies.
 □ diode □ n Terminal Strip or □ diode □ n □ diode □ board



Wire Ramp shown cut for clarity.

Sec. 3: ... Diagnostics

Go To
Diagnostics Menu

PLAYBOY

Section 3, Chapter 2
Page 23



Test Flash Lamps

To initiate, from the **DIAGNOSTICS MENU**, select the "FLASH" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. After selecting this *Icon* the display will indicate **CYCLING FLASHERS**. The Flash Lamps will cycle continuously until the test is exited. This test allows the technician to easily spot any burned-out bulbs and replace them. Flashers tested are Flash Lamps in Positions: **Q1-Q32** and in this game Flash Lamp(s) are in Position(s): **Q25-Q29**.

COIN DOOR IS OPEN
PLAYFIELD HIGH POWER
DISABLED BY
COIN DOOR INTERLOCK

PULL OUT the Power Interlock Switch
for operation with the Coin Door open.



Clear Ball Trough

To initiate, from the **DIAGNOSTICS MENU**, select the "CLR" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. This Menu is provided to allow the technician a simple method of removing the balls from the trough and also, to test functionality of the trough, ensuring proper trough operation. After selecting this *Icon* the display will show a graphic of the ball trough with balls in the trough with it's corresponding switch number. Select the "RUN" *Mini-Icon* to eject the ball in the first position. Simultaneously, the display and the playfield will eject the ball to the Trough Up-Kicker, eject from the Trough Up-Kicker into the Shooter Lane and will be ejected onto the playfield where the technician can easily retrieve the pinball or allow the ball(s) to re-enter the trough to continue **Clear Ball Trough Test**.

⚠ **CAUTION:** Continuous use of above test may overheat the Trough Up-Kicker Coil. ⚠

COIN DOOR IS OPEN
PLAYFIELD HIGH POWER
DISABLED BY
COIN DOOR INTERLOCK

PULL OUT the Power Interlock Switch
for operation with the Coin Door open.



Technician Alerts

To initiate, from the **DIAGNOSTICS MENU**, select the "TECH" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. This Menu is provided to show any switch problems and/or missing pinballs. After selecting this *Icon*, the display will indicate *any or all* of the following categories: **POSSIBLY BROKEN SWITCH**, **CHECK SWITCHES** or **HYPER-SENSITIVE SWITCH** (Sw. #16, Shooter Lane, is used as an example). If more than one switch is reported, the Switch Number and Name will cycle within the category, and then will cycle the categories. To return to the **DIAGNOSTICS MENU**, select & activate the "PREV" *Mini-Icon*.

PLAYFIELD STATUS
POSSIBLY BROKEN SWITCH
#02 SHOOTER LANE
PREV QUIT ?

PLAYFIELD STATUS
CHECK SWITCHES
#02 SHOOTER LANE
PREV QUIT ?

PLAYFIELD STATUS
HYPERSENSITIVE SWITCH
#02 SHOOTER LANE
PREV QUIT ?

Switch Detection

During game play, activation of switches and operation of coils with associated switches are monitored. In programming, every switch is given a minimum & maximum value based on the game. The switches are monitored every 5 minutes of game play with a "sliding window" of 15 minutes. If a switch is determined to be faulty, game play is compensated. Switches noted as **POSSIBLY BROKEN SWITCH** should be checked, then adjusted or replaced. **Important:** A switch reported as "possibly broken" may actually be an unused switch due to **lack of usage** and **not because they're broken**. This can happen, if a switch is located in a "hard" shot position, and the players are not making the shot. Game programming will still compensate for this unplayed switch. Switches noted as **CHECK SWITCHES** are determined to be stuck closed or open depending on switch usage. Free up the switch actuator; adjust or replace if necessary. Switches noted as **HYPERSENSITIVE SWITCH** means just that, the switch should be readjusted or replace if necessary.

Determination of switch usage can be check in **Audits** (review Section 3, Chapter 3, **GO TO AUDITS MENU**). Find the associated Audit with the switch in question and check usage; compare it to commonly used switches for comparison. After any switch is checked and repaired or replaced, it's suggested to test the switch in the **PLAY TEST MENU** (see the **next page**) or **Single Coil Test** (reviewed earlier in this chapter, **Page 18**) where the associated coil to the switch can be tested as well. After correcting the problem, the switch will still be reported until the game is played and the switch is again monitored as specified above. *Only you can determine if a switch getting reported is bad or if the switch is currently not getting actuated during game play.*

Coils **are not reported** in **Technician Alerts**, however, if a faulty switch is the culprit, the switch will then be reported. This **display** is shown momentarily during **Game Mode** or **Power-Up** to alert the operator of a coil malfunction (coil doesn't energize or coil fires a multiple number of times). **OPERATOR ALERT!** works by monitoring any *switch activated coil* that has the potential to trap a ball when disabled (e.g. in the Auto Launch, Scoop, Eject, etc.). This alert can also appear if a switch associated with a coil (e.g. #16 Shooter Lane & #2 Auto Launch) is stuck closed (caused by a switch jam or stuck ball); the **CPU/Sound Board** will *activate* the coil approximately ten times and if the switch remains closed, the game will report this switch in **Technician Alerts** as **CHECK SWITCHES**. The display alert **PLEASE CHECK TECH REPORT** will be shown.

Technicians Alerts continued on the next page.

OPERATOR ALERT!
#2 AUTO LAUNCH
COIL MALFUNCTION

PLEASE CHECK
TECH REPORT
PORTALS->DIAG->TECH





Technician Alerts Continued

While in **Technician Alerts** Menu, if the following is displayed, the game has detected 1 or more pinball(s) missing and has compensated for the lost pinball(s) to provide normal game play

Continued

PLAYFIELD STATUS
PINBALL MISSING

PREVIOUS

Important: Determine where the pinball is! **Do not add pinball(s)** until it is determined the pinball(s) are indeed missing and not just stuck. If pinball(s) are added, and if the original stuck pinball has freed itself, the pinball game will not operate properly with the extra pinball(s). When the pinball is recovered, the above display will not appear the next time **Technician Alerts** is visited (a game must be played for the pinball to be determined as found).

Pinball Detection

During game play, a ball can get trapped or stuck. If after approximately 15 seconds of inactivity or "no scoring," **Ball Search** is started. **Note:** If the pinball is in the Plunger Lane or "held" on the flipper, no **Ball Search** will be performed. The game will perform one **Ball Search** in an attempt to "find" or free-up the pinball. If the game does not see a switch closure (indicating the pinball has not been found), the following display will appear with a count-down timer of 20 seconds, during which **Ball Search** will continue until the timer runs out (this feature will not happen if the game is in **Competition Mode**; **Ball Search** will continue until the pinball is found, unstuck and/or replaced manually). The display will momentarily acknowledge the missing pinball(s). The game will provide another pinball into play and will compensate for the lost pinball. Game play will appear normal. **Note:** This detection and compensation will happen with every pinball, if each suffers the same fate of a ball trap. If **all** balls get trapped, the game cannot be played or started until the situation is rectified.

Until any missing pinball is returned to play, the game upon **Power-up**, opening the **Coin Door** or exiting **Portals**, will continue to momentarily display the following (along with an audible sound):

LOOKING FOR
PINBALLS
PLEASE WAIT 20

PLEASE CHECK
TECH REPORT
PORTALS->DIAG->TECH



Service Phone

To initiate, from the **DIAGNOSTICS MENU**, select the "SERV" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** **Buttons** and press the **Black "ENTER"** **Button**. After selecting this *Icon* the display will indicate a phone number to call if technical assistance is required (In USA Code: 1-800-KICKERS).



Begin Play Test

To initiate, from the **DIAGNOSTICS MENU**, select the "PLAY" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** **Buttons** and press the **Black "ENTER"** **Button**. After selecting this *Icon* the technician can test certain play functions to insure all switch activated coils function without entering game play. For example, by rolling the ball over the Shooter Lane switch, the Autoplunger should fire. If it kicks to early or too late, the switch actuator should be adjusted to compensate for this error. If it fails to fire, use the **Switch Test** or **Coil Test** to help determine the cause of the failure. During this function, similar tests may be performed on the "Ejects", Slingshots, Vertical Up-Kickers, Pop Bumpers, etc. in the game. For unique Play Test functions, select the "GAME NAME" **TEST(S)** *Icon* in the **DIAGNOSTICS MENU**.

COIN DOOR IS OPEN
PLAYFIELD HIGH POWER
DISABLED BY
COIN DOOR INTERLOCK

PULL OUT the Power Interlock Switch for operation with the Coin Door open.



Fire Klocker

To initiate, from the **DIAGNOSTICS MENU**, select the "KNOCKER" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** **Buttons** and press the **Black "ENTER"** **Button**. The digitally mastered "Knocker" is sounded.



Sound / Speaker Test

To initiate, from the **DIAGNOSTICS MENU**, select the "SPKR" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** **Buttons** and press the **Black "ENTER"** **Button**. The BSMT 2000 Sound System produces true digital stereo sound from Backbox & Cabinet Speakers or "Mono" on the Cabinet Speaker (when used by itself). After selecting this *Icon*, select the "-" or "+" *Mini-Icons* and press the **Black "ENTER"** **Button** to activate the first test. Repeat to visually see & hear all tests. Select the "RUN" *Mini-Icon* to activate the test chosen without moving to the next test.

Note: During Sound Tests, the display shows the speaker identification and the corresponding sound(s). The sound functions allow verification that both channels are functioning properly & that the speaker connections are correct.

Sound / Speaker Test continued on the next page.



Sound / Speaker Test Continued

Speaker Phase Testing

Connections to each of speakers are polarized and each must be connected appropriately for the best quality sound. If one speaker has the positive and negative connections reversed with respect to the other one, bass frequencies will not be produced properly and the overall sound quality will be poor. To test for proper speaker phasing, use the sound test to cycle through the Backbox & Cabinet, and Backbox Sine (repeated) functions. If the Cabinet Sine produces more volume and bass than the Left Sine, the speakers are connected properly. If it produces the same or less, one speaker is connected improperly. To isolate and correct reversed speaker connections, one of two methods may be used.

1. Check each speaker for polarity markings. If the speakers have polarity markings, verify that the Backbox Speaker **RED-WHT** Wire and the Cabinet Speaker **YEL-WHT** Wire is connected to the negative (-) terminal.
2. Disconnect the speaker output connector from the CPU / Sound Board and connect a 1.5-volt battery across each speaker pair one at a time while observing the speakers. Make sure the positive battery terminal is connected to the positive lead (CN4, Pin-3 (**RED-BLK**) or Pin-6 (**YEL-BLK**)) each time. As the connection is made, check speaker cone movement; proper connections are indicated by outward movement.

Auto / Manual Tests	Sounds Produced
Speaker Test	Tone
Sound/OPSYS EPROM (Loc. U7)	Level 1-3+ (Music Test)
Voice ROMs: 1 (U17) 2 (U21) 3 (U36) 4 (U37)	Speech Pattern 1-3+

Note: For ROM Locations, see Page DR. ❶. For ROM Usage (Summary Table) see Page DR. ❸ in the "Find-It-In-Front: Dr. Pinball Section". Voice ROMs (U17, U21, U36 & U37) which are 8MB must have a Jumper at W6 on the CPU/Sound Board to function properly.



Begin Burn In

To initiate, from the **DIAGNOSTICS MENU**, select the "BURN" *Icon* with either the Red "**LEFT**" or Green "**RIGHT**" Buttons and press the Black "**ENTER**" Button. After selecting this *Icon* the **Begin Burn-In Test** will start. At this stage the game will exercise all CPU I/O Functions (**Dot Matrix Display Test**, **Coil Testing**, **Lamp Testing**, **Sound...**, etc.). This is provided to constantly exercise sounds, coils, etc... Cumulative Burn-In minutes will be displayed. **Note:** To reset Burn-In minutes to **00** see Section 3, Chapter 6, **GO TO RESET MENU**, **Factory Reset**. **Caution:** Performing a Factory Reset will reset all other information as well.



Dot Matrix Test

To initiate, from the **DIAGNOSTICS MENU**, select the "DOT TEST" *Icon* with either the Red "**LEFT**" or Green "**RIGHT**" Buttons and press the Black "**ENTER**" Button. After selecting this *Icon* the **Dot Matrix Test** immediately begins. The display will immediately illuminate & cycle for 1 pass of each test continuously for each of the following tests:

1. Illuminates 1 vertical column of dots, turning it off & illuminating the next column, until each column has been individually lit, while the other columns are off.
2. Illuminates 1 horizontal row of dots, turning it off & illuminating the next row, until each row has been individually lit, while the other rows are off.
3. Illuminates all the dots, except for one column from left to right.
4. Illuminates all the dots, except for one row from top to bottom.
5. Illuminates every other dot lit, in both the rows and columns.

Note: Pressing any button will exit the test & return to **DIAGNOSTICS MENU**.

Dot Matrix Display Explained

The display utilizes a **Micro-Processor Control Board** mounted in piggyback fashion to the **Dot Matrix Display (128 X 32) Driver Board**. The purpose behind this board is to provide more information to the operator as well as displaying graphics to the player.

The board is controlled by a **6809E Microprocessor** and its personality ROM (Unique to the Game). It receives Data, Reset & Clock Information from the **CPU/Sound Board** via the ribbon cable and sends back multiple Status and Busy Signals to the **CPU**. This is to insure synchronized communication between the **CPU** and the **Display Controller Board**. The Drivers for the rows and columns are provided on 5 surface mounted integrated circuits on the **Dot Matrix Display Driver Board**.





Go To Playboy Tests

To initiate, from the **DIAGNOSTICS MENU**, select the "PB" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. After selecting the "PB"

COIN DOOR IS OPEN
PLAYFIELD HIGH POWER
DISABLED BY
COIN DOOR INTERLOCK

PULL OUT the Power Interlock Switch for operation with the Coin Door open.



Display indicates Mech. is "Closed":

CENTERFOLD MOTOR TEST
STOPPED
□-CENTERFOLD #1 (SW.43)
■-CENTERFOLD #2 (SW.44)
PULSE RUN PREV QUIT

... indicates Mech. is "Inbetween Limits":

CENTERFOLD MOTOR TEST
OPENING
■-CENTERFOLD #1 (SW.43)
■-CENTERFOLD #2 (SW.44)
PULSE RUN PREV QUIT

Display indicates Mech. is "Open":

CENTERFOLD MOTOR TEST
STOPPED
■-CENTERFOLD #1 (SW.43)
□-CENTERFOLD #2 (SW.44)
PULSE RUN PREV QUIT



Icon, the **PLAYBOY TESTS MENU** appears, with the "CF" *Icon* flashing. This Sub-Menu is used to test the operation of the **Centerfold Motor & Switches** ("CF" *Icon*), **Triangle Motor & Switches** ("TRI" *Icon*) and **Stepper Motor & Switch** ("STEP" *Icon*) (Detailed on the next page). To initiate, from the **MONOPOLY TESTS MENU**, select one of the 3 *Icons* with either the Red or Green Buttons and press the Black Button. After finishing the selected Test, select the "PREV" *Mini-Icon* to return to **PLAYBOY TESTS MENU** or select either of the "<<" or ">>" *Mini-Icons* to slip between the 3 Testing Sub-Menus.



CAUTION: Please be aware of any **MOVING PARTS!**

Note: Upon Power-Up (quitting *Portals™* initiates the "Power-Up Mode"), the all mechanisms will return to it's home position as shown.

Centerfold Motor Test

Selecting the "CF" *Icon* will bring up the **CENTERFOLD MOTOR TEST MENU**. This test is provided to allow a method of testing the **Centerfold Motor (Open/Close) (Q32)** in conjunction with the **Motor Relay Board (On/Off) (Q31)** and the **Centerfold (Motor) Switches (Sw. 43 & Sw. 44)**. Upon entering the test, the display will indicate the status of the Relay Board (either **STOPPED** or **OPENING**) and indicated the status of either **Switch** (the "RUN" *Mini-Icon* will be flashing). Select either the "RUN" or "PULSE" *Mini-Icons*. Activating the "RUN" *Mini-Icon* will cycle the motor until the Centerfold Assembly is completely **OPEN** or **CLOSED**. Activating the "PULSE" *Mini-Icon* will pulse the motor. Watch the display, as the Centerfold **OPENS** or **CLOSES**, the switches will close (the ☐ box will turn solid ☒).

Triangle Motor Test

Selecting the "TRI" *Icon* will bring up the **TRIANGLE MOTOR TEST MENU**. This test is provided to allow a method of testing the **Triangle Billboard Motor (Rotating)** via the **Motor Relay Bd. (Q22)** & the **Triangle Mech Switches (Sw. 29 & Sw. 30)**. Upon entering the test, the display will indicate the status of either/both **Switches** (the "RUN" *Mini-Icon* will be flashing). Select the "RUN" *Mini-Icon*. Activating the "RUN" *Mini-Icon* will cycle the motor to the next switch closure state (either to the Left or Right). Watch the display, as the Triangle Billboard Assy. **ROTATES LEFT** or **RIGHT**, the **Triangle Mech #1 Switch (Sw. 29)** and/or **#2 Switch (Sw. 30)** will close (the ☐ box will turn solid ☒).

Note: During Normal Operation, when the CPU registers the desired state change on the switches, it will turn-off the motor. There will be "overtravel" so the switches in Diagnostics will not show the proper state, though the unit is in the correct position.



... "Triple Jackpot" faces Front.

TRIANGLE MOTOR TEST
□-TRIANGLE MECH #1 (SW.29)
■-TRIANGLE MECH #2 (SW.30)
PULSE RUN PREV QUIT

... Inbetween Positions.

TRIANGLE MOTOR TEST
■-TRIANGLE MECH #1 (SW.29)
■-TRIANGLE MECH #2 (SW.30)
PULSE RUN PREV QUIT

... "Rabbit Head" faces Front.

TRIANGLE MOTOR TEST
□-TRIANGLE MECH #1 (SW.29)
□-TRIANGLE MECH #2 (SW.30)
PULSE RUN PREV QUIT

... "Splash" faces Front.

TRIANGLE MOTOR TEST
■-TRIANGLE MECH #1 (SW.29)
□-TRIANGLE MECH #2 (SW.30)
PULSE RUN PREV QUIT

Go To Playboy Tests continued on the next page.



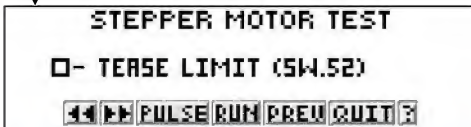
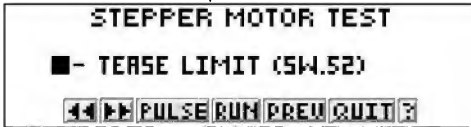
Go To Playboy Tests Continued



CAUTION: Please be aware of **MOVING PARTS!**

COIN DOOR IS OPEN
PLAYFIELD HIGH POWER
DISABLED BY
COIN DOOR INTERLOCK

Continued



Stepper Motor Test

Selecting the "STEP" Icon will bring up the **STEPPER MOTOR TEST MENU**. This test is provided to allow a method of testing the Drop Screen (Tease) Stepper Motor (Drop Screen Stepper #1: Q19, Drop Screen Stepper #2: Q20, Drop Screen Stepper #3: Q21 & Drop Screen Stepper #4: Q23) and the Tease Screw Limit Switch (Sw. 52). Upon entering the test, the display will indicate the status of the Switch (the "RUN" Mini-Icon will be flashing). Select either the "RUN" or "PULSE" Mini-Icons. Activating the "RUN" Mini-Icon will cycle the motor until the Drop Screen (Tease) Assembly is completely **DOWN** or **UP**. Activating the "PULSE" Mini-Icon will pulse the motor. Watch the display, as the Drop Screen (Tease) Assembly moves **DOWN**, the Tease Screw Limit Switch (Sw. 52) will open (the ☒ box will turn ☐).

Note: Upon Power-Up (quitting Portals™ initiates the "Power-Up Mode"), the mechanism will return to it's home position as shown.



Above: Front view - Tease Screen closed.



Above: Front view - Tease Screen opening.



Above: Under playfield view - Tease Screen closed.



Above: Under playfield view - Tease Screen opened.



Left: Rear view - Switch 52 shown in the **closed** position.

Right: Rear view - Switch 52 shown in the **open** position.





Go To Fuse Table

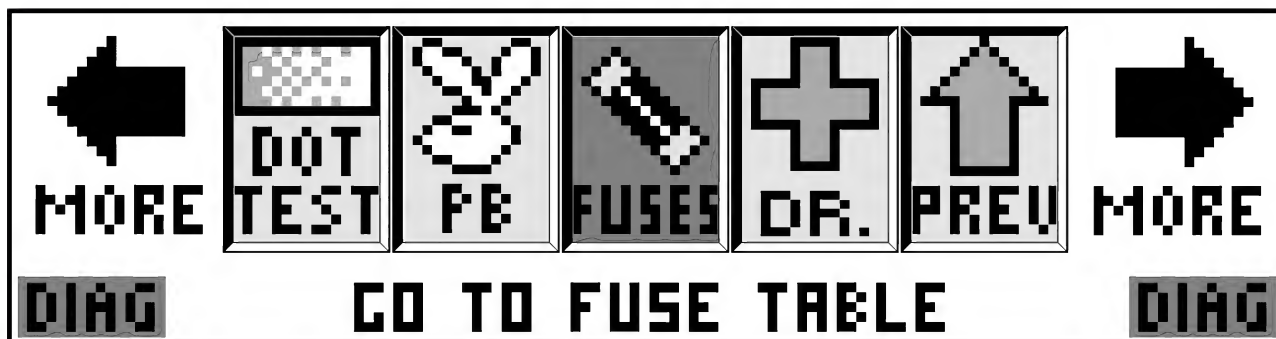
To initiate, from the **DIAGNOSTICS MENU**, select the "FUSES" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. The **FUSE TABLE MENU** now appears. This provides the technician with the current **Fuse Table** for this game (also noted on decal in the Backbox). The fuses are located in the Backbox (on the **Display Power Supply Board** and the **I/O Power Driver Board**), and also in the Cabinet (under the playfield by the Flippers and/or by any unique assembly requiring an additional fuse, such as magnets). For the complete **Fuse List** in the Quick Reference Fuse Chart & Pictorials, see the next page or Page DR. ① (front of this manual).

Example:

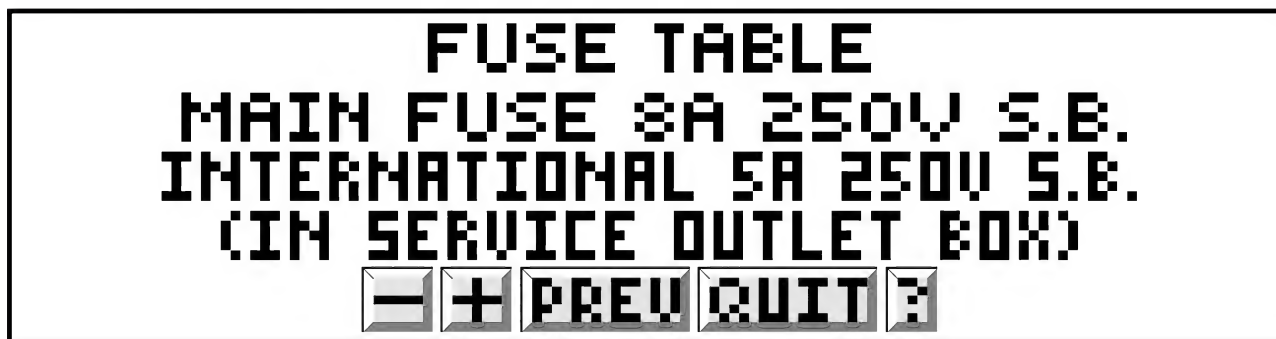
After entering **Portals™**, the **MAIN MENU** now appears with the "DIAG" *Icon* (GO TO DIAGNOSTICS MENU) flashing:



Press the Black "ENTER" Button to *activate* this **ICON**. The **DIAGNOSTICS MENU** now appears with the "SW" *Icon* (GO TO SWITCH MENU) flashing; use the Red "LEFT" or Green "RIGHT" Buttons, until the "FUSES" *Icon* (GO TO FUSE TABLE) is flashing:



Press the Black Button to *activate* this **ICON**. The **FUSE TABLE** now appears.



Select and *activate* the "+" *Mini-Icon* to view the next fuse in the group. Continue to select either the "+" or "-" *Mini-Icons* to view each fuse one at a time. The display will describe the fuse identification number (e.g. Main, F1, F6, F7, etc.), rating of fuse (e.g. 5A 250v S.B. - i.e. 5 Amp, 250 volt, Slo-Blo), location of fuse (i.e. Backbox: Board Name located on; or Cabinet: Under the playfield or in Service Outlet), and 'use of fuse' (e.g. 90v DC High Voltage Power, etc.). The current fuse listed will remain in the display until the next fuse is chosen or when the Sub-Menu is exited by selecting & *activating* the "PREV" or "QUIT" *Mini-Icons*.

Go To Fuse Table continued on the next page.

▼ BACKBOX LAYOUT LOCATIONS: Fuses, Bridges, Relays & ROMs ▼



CAUTION: For continued protection against risk of fire, replace only with same type of fuse having the same electrical rating!



QUICK REFERENCE FUSE CHART

Backbox Fuses

LOC: DISPLAY POWER SUPPLY (P.S.) BOARD

F1 3/4A 250v S.B. 90v DC High Voltage Display

LOC: I / O POWER DRIVER BOARD

F6	7A 250v S.B.	50v DC	Primary High Power Coils/Flippers
F7	5A 250v S.B.	20v DC	Low Power Coils
F8	5A 250v S.B.	12v DC	Logic Power
F9	5A 250v S.B.	12v DC	Logic Power
F20	3A 250v S.B.	50v DC	Magnet
F21	3A 250v S.B.	50v DC	Coils
F22	8A 250v S.B.	18v DC	Controlled Lamps
F23	4A 250v S.B.	5v DC	Logic
F24	5A 250v S.B.	6.3v AC	G.I. Lamps (BRN-WHT to WHT-BRN)
F25	5A 250v S.B.	6.3v AC	G.I. Lamps (YEL to WHT-YEL)
F26	5A 250v S.B.	6.3v AC	G.I. Lamps (GRN to WHT-GRN)
F27	5A 250v S.B.	6.3v AC	G.I. Lamps (VIO to WHT-VIO)
F28	3A 250v S.B.	24v AC	Not Used / Spare

Cabinet Fuses

LOC: SERVICE (AC) OUTLET BOX (Cabinet Bottom)

n/a 8A 250v S.B. 115v AC Main Fuse Line (Domestic or USA)

n/a 5A 250v S.B. 220v AC Main Fuse Line (International)

Playfield Fuses

LOC: UNDER PLAYFIELD (near Flippers)

n/a 3A 250v S.B. 50v DC Rt. Flipper (BLU-YEL ↔ RED-YEL)

n/a 3A 250v S.B. 50v DC Lt. Flipper (GRY-YEL ↔ RED-YEL)

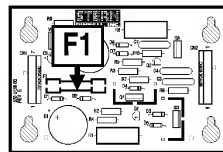
n/a 3A 250v S.B. 50v DC Up. Flipper (GRY-YEL ↔ RED-YEL)

For locations & more information on fuses, see Sec. 5, Chp. 2.

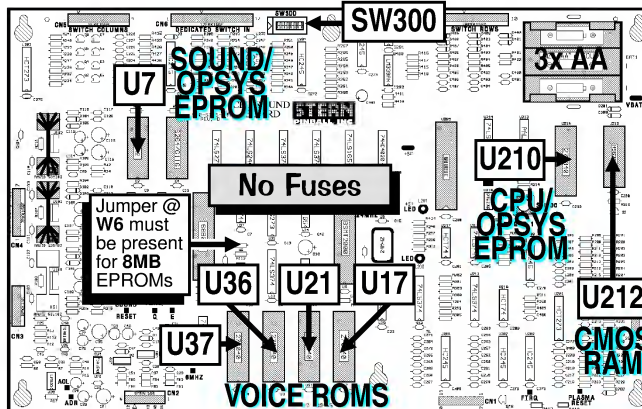
For Backbox & Cabinet General Parts, review Section 4, Chapter 1, Parts Identification & Location (The Pink Pages).

For Schematics and/or Component Parts on PC Boards shown, review Section 5, Chapter 4, Printed Circuit Boards (The Yellow Pages).

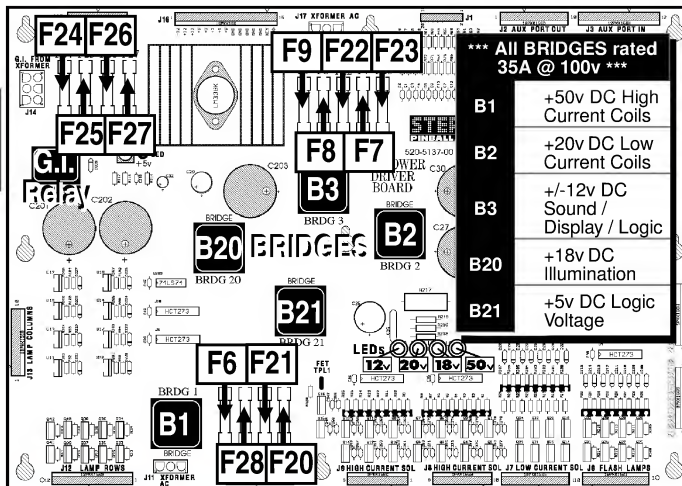
Display Power Supply Board



CPU / Sound Board



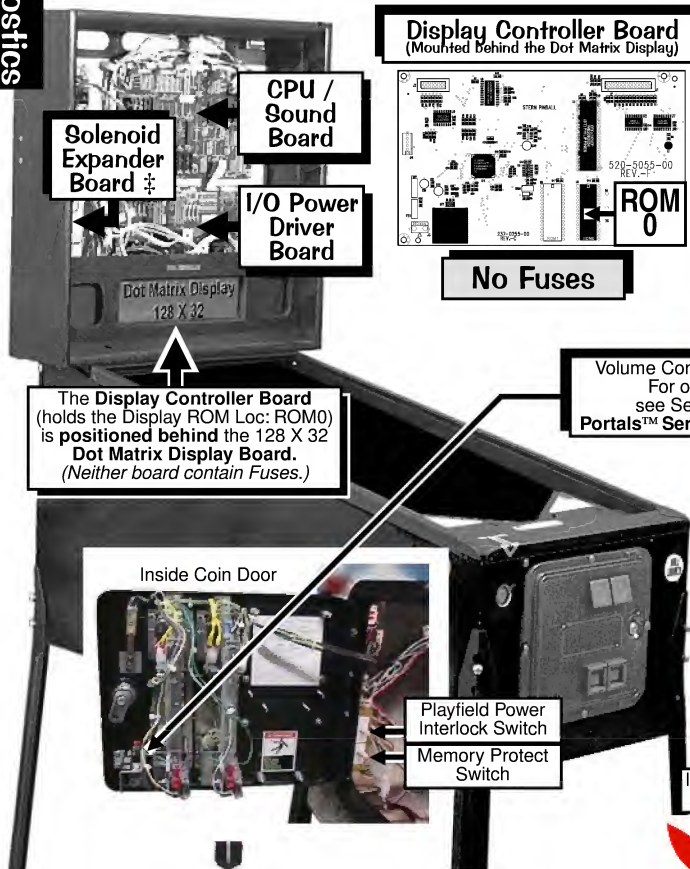
I/O Power Driver Board



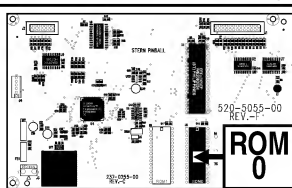
*** All BRIDGES rated 35A @ 100v ***

B1	+50v DC High Current Coils
B2	+20v DC Low Current Coils
B3	+/-12v DC Sound / Display / Logic
B20	+18v DC Illumination
B21	+5v DC Logic Voltage

Sec. 3: ... Diagnostics



Display Controller Board (Mounted behind the Dot Matrix Display)



No Fuses

Solenoid Expander Board

CPU / Sound Board

I/O Power Driver Board

The Display Controller Board (holds the Display ROM Loc: ROM0) is positioned behind the 128 X 32 Dot Matrix Display Board. (Neither board contain Fuses.)

Volume Control & Service Switches
For operational usage, see Section 3, Chapter 1, Portals™ Service Menu Introduction.

Inside Coin Door

Playfield Power Interlock Switch

Memory Protect Switch

Service Outlet (on Power Box)

On/Off Switch (Under Pwr. Box)

INSIDE VIEW OF THE PINBALL CABINET

Int'l.: 5 Amp 250v Slo-Blo Fuse

USA: 8 Amp 250v Slo-Blo Fuse

Transformer on Cabinet Bottom





Dr. Pinball

To initiate, from the **DIAGNOSTICS MENU**, select the Cross "DR." *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. This will bring you (the operator / technician) into **DR. PINBALL (Flow Chart Menus)** which offers you a choice of three (3) *Icons*: Coil "DR.", Switch "DR." and Lamp "DR." *Icons*. Selecting a particular *Icon* will give you a choice of which specific Coil (*any and all coil assemblies such as Flippers, VUKs, Magnets, etc.*), Switch or Lamp circuit needs to be diagnosed. *Dr. Pinball* will now display a question or give a procedure to follow such as "Does the lamp turn on?" or "Check bridge rectifier BR-20, if short replace." When *Dr. Pinball* displays a question or requests a procedure, *Dr. Pinball* will expect a response such as "NO" or "YES" (*see below examples of the Mini-Icons* which will prompt the operator). You the operator/technician must respond by using the **Red** or **Green Buttons** to "SELECT" a *Mini-Icon* and the **Black Button** to "ACTIVATE or ENTER" your selection.



Coil Flow Chart

To initiate, from the **DR. PINBALL MENU**, select the Coil "DR." *Icon* with either the **Red** or **Green Buttons** and press the **Black Button**. This is the **Coil Flow Chart**. Follow the questions, answering by using the *Mini-Icons* in the display.



Switch Flow Chart

To initiate, from the **DR. PINBALL MENU**, select the Switch "DR." *Icon* with either the **Red** or **Green Buttons** and press the **Black Button**. This is the **Switch Flow Chart**. Follow the questions, answering by using the *Mini-Icons* in the display.



Lamp Flow Chart

To initiate, from the **DR. PINBALL MENU**, select the Lamp "DR." *Icon* with either the **Red** or **Green Buttons** and press the **Black Button**. This is the **Lamp Flow Chart**. Follow the questions, answering by using the *Mini-Icons* in the display.

The following are the *Mini-Icons* with explanations for the **DR. PINBALL** Sub-Menus:



Select and *activate* either the "-" or "+" *Mini-Icons* to diagnose a Coil, Lamp or Switch. Select and *activate* the "RUN" *Mini-Icon* to test selected item. The "PREV" *Mini-Icon* allows you to go back to previous question. Select the "QUIT" *Mini-Icon* to exit **Portals™** completely. Select the "?" *Mini-Icon* (Help) to see directions on button usage.



Select and *activate* either the "NO" or "YES" *Mini-Icons* to answer a question given. Select and *activate* the "END" *Mini-Icon* to change to a new item to test. The "PREV" *Mini-Icon* allows you to go back to previous question. Select the "QUIT" *Mini-Icon* to exit **Portals™** completely. Select the "?" *Mini-Icon* (Help) to see directions on button usage.



After a diagnosis is given, select and *activate* the "END" *Mini-Icon* to change to a new item to test. The "PREV" *Mini-Icon* allows you to go back to previous display. Select the "QUIT" *Mini-Icon* to exit **Portals™** completely. Select the "?" *Mini-Icon* (Help) to see directions on button usage.



In **COIL FLOW CHART MENU**, select and *activate* the "PULSE" *Mini-Icon* to pulse the coil selected. Select and *activate* the "END" *Mini-Icon* to change to a new item to test. The "PREV" *Mini-Icon* allows you to go back to previous question. Select the "QUIT" *Mini-Icon* to exit **Portals™** completely. Select the "?" *Mini-Icon* (Help) to see directions on button usage.

AUDIT TABLE



VOLUME SETTING: ☐ ☐ GAME LOCATION NAME:

STARTING METER Reading:

STARTING METER Date (MM/DD/YR):

AUDITOR'S NAME:

CURRENT METER Reading:

AUDIT Date (MM/DD/YR):

CPU Version: DISPLAY Version:



01-14

TOTAL PAID CREDITS

01:

FREE GAME PERCENTAGE

02:

AVERAGE BALL TIME

03:

AVERAGE GAME TIME

04:

COINS THRU LEFT SLOT

05:

COINS THRU RIGHT SLOT

06:

COINS THRU CENTER SLOT

07:

COINS THRU 4TH SLOT

08:

COINS THRU 5TH SLOT

09:

COINS THRU 6TH SLOT

10:

TOTAL COINS

11:

TOTAL EARNINGS

12:

METER CLICKS

13:

SOFTWARE METER

14:



15-68

TOTAL BALLS PLAYED

15:

TOTAL EXTRA BALLS

16:

EXTRA BALL PERCENT

17:

REPLAY 1 AWARDS

18:

REPLAY 2+ AWARDS

19:

TOTAL REPLAYS

20:

REPLAY PERCENT

21:

TOTAL SPECIALS

22:

SPECIAL PERCENT

23:

TOTAL MATCHES

24:

HIGH SCORE AWARDS

25:

HIGH SCORE PERCENT

26:

TOTAL FREE PLAYS

27:

TOTAL PLAYS

28:

0 - 3M SCORES

29:

3M - 4M SCORES

30:

4M - 5M SCORES

31:

5M - 5.5M SCORES

32:

5.5M - 6M SCORES

33:

6M - 6.5M SCORES

34:

6.5M - 7M SCORES

35:

7M - 7.5M SCORES

36:

7.5M - 8M SCORES

37:

8M - 8.5M SCORES

38:

8.5M - 9M SCORES

39:

9M - 9.5M SCORES

40:

9.5M - 10M SCORES

41:

10M - 12M SCORES

42:

12M - 15M SCORES

43:

15M - 20M SCORES

44:

20M+ SCORES

45:

AVERAGE SCORES

46:

SERVICE CREDITS

47:

BALL SEARCH STARTED

48:

LOST BALL FEEDS

49:

LOST BALL GAME STARTS

50:

LEFT DRAINS

51:

CENTER DRAINS

52:

RIGHT DRAINS

53:

TILTS

54:

TOTAL BALLS SAVED

55:

PROPRIETARY (56)

PROPRIETARY (57)

PROPRIETARY (58)

PROPRIETARY (59)

PROPRIETARY (60)

PROPRIETARY (61)

PROPRIETARY (62)

PROPRIETARY (63)

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PROPRIETARY (109)

PROPRIETARY (110)

PROPRIETARY (111)

PROPRIETARY (112)

PROPRIETARY (113)

PROPRIETARY (114)

PROPRIETARY (115)

PROPRIETARY (63)

BASE REPLAY

64:

LEFT FLIPPER USED

65:

RIGHT FLIPPER USED

66:

PROPRIETARY (67)

PROPRIETARY (68)

PROPRIETARY (69)

PROPRIETARY (70)

PROPRIETARY (71)

PROPRIETARY (72)

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PROPRIETARY (119)

PROPRIETARY (120)

PROPRIETARY (121)

PROPRIETARY (122)

PROPRIETARY (123)

ADV. TOWARDS CTRFOLD MB

69:

CTR FOLD MB LIT

70:

CTR FOLD MB STARTS

71:

2+ CTR FOLD MB STARTS

72:

CTR FOLD MB JACKPOTS

73:

CTR FOLD MB 2X JPOT LIT

74:

CNT FOLD MB 2X JPOTS

75:

CTR FOLD MB 3X JPOT LIT

76:

CTR FOLD MB 3X JPOTS

77:

RABBIT HEADS (LOOPS)

78:

RABBIT HEADS (RT RAMP)

79:

RABBIT HEADS (T. LANES)

80:

RABBIT HEADS (B. LANES)

81:

TOTAL RABBIT HEADS

Go To Audits Menu

Overview

The **Portals™ Service Menu System** provides **172** Audits for accounting purposes and for evaluation of *Game Programming*. The Audits are divided into 3 groups: • **Earnings Audits** (Audits **01-14**), • **Standard Audits** (Audits **15-68**) and • **Feature Audits (Programming Use Only)** (Audits **69-172**). Audits which are named **Proprietary** are also for **Future Expansion or Programming**. Game code may get upgraded during production; compare all Audits in the display with the manual and make any corrections to the Audit Table (*previous page*), as necessary. Audits are subject to change (with or without notice). To view Audits in the display, enter the **Portals™ Service Menu System**. For how to **RESET** Audits, see **Section 3, Chapter 6, GO TO RESET MENU**.

EXPLANATION & USAGE OF COMMON LARGE & MINI-ICONS USED IN VARIOUS MENUS & SUB-MENUS:



These *non-selectable* icons appear in the selected Menu only when there are MORE icons to the LEFT or to the RIGHT available for selection.



Select and activate to return to the PREVIOUS Menu.



Select and activate to QUIT, exits & returns to the Attract Mode.



Select and activate to view HELP Screens of the current Menu*.



Select and activate to: Move LEFT or RIGHT, select previous / next or move backwards / forwards.

* Help Note: An explanation of each Mini-Icon at that menu level will cycle continuously. To exit a display where no Mini-Icons are available for selection, pressing any button will exit the display.



GO TO AUDITS MENU

After entering **Portals™**, the **MAIN MENU** now appears. Select the "AUD" Icon in the **MAIN MENU** with either the Red "LEFT" or Green "RIGHT" Buttons (the **Flipper Buttons** operates in the same manner) and press the Black "ENTER" Button (the **Start Button** operates in the same manner). The **AUDITS MENU** appears. Continue through this chapter for the explanation & usage of the *Icons* in the **AUDITS MENU**.



Earnings Audits (01-14)

To initiate, from the **AUDITS MENU**, select the "EARN" Icon with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. Select and activate either of the ">>" Mini-Icons to view the next or previous Audit in this group. The display will describe the Audit Number, Audit Name and the current Audit Total or Value. The current Audit will remain in the display until the next Audit is chosen or when the Sub-Menu is exited.

Aud. No	Audit Name	Audit Definition
01	TOTAL PAID CREDITS	Provides the total number of paid credits.
02	FREE GAME PERCENTAGE	Provides the percentage total by dividing Audit 27, TOTAL FREE PLAYS , by Audit 28, TOTAL PLAYS .
03	AVERAGE BALL TIME	In seconds, the average ball time is derived from the total play time divided by Audit 15, TOTAL BALLS PLAYED .
04	AVERAGE GAME TIME	The average game time is expressed in minutes and seconds (0:00).
05	COINS THRU LEFT SLOT	Provides the total number of times Coin Mech. Switch 06 was closed.
06	COINS THRU RIGHT SLOT	Provides the total number of times Coin Mech. Switch 04 was closed.
07	COINS THRU CENTER SLOT	Provides the total number of times Coin Mech. Switch 05 was closed.
08	COINS THRU 4TH SLOT	Provides the total number of times Coin Mech. Switch 02 was closed.
09	COINS THRU 5TH SLOT	Provides the total number of times Coin Mech. Switch 07 was closed.
10	COINS THRU 6TH SLOT	Provides the total number of times Coin Mech. Switch 03 was closed.
11	TOTAL COINS	Provides the total amount of coins registered through all the slots.
12	TOTAL EARNINGS	The total cash value accumulated since the last Factory Reset occurred. See Sec. 3, Chp. 6, GO TO RESET MENU, Reset Coin Audits .
13	METER CLICKS	Provides the total number of money clicks accumulated. Based on the country's lowest coin denomination used for the game credit.
14	SOFTWARE METER	Provides the continuing total of Meter Clicks. This audit cannot be reset; the display shows the constant addition of Meter Clicks.



Standard Audits (15-68)

To initiate, from the **AUDITS MENU**, select the "S.P.I." *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Audit in this group. The display will describe the Audit Number, Audit Name and the current Audit Total or Value. The current Audit will remain in the display until the next Audit is chosen or when the Sub-Menu is exited.

Aud. Nº	Audit Name	Audit Definition
15	TOTAL BALLS PLAYED	Provides the total number of <i>Regular</i> and <i>Extra Balls</i> .
16	TOTAL EXTRA BALLS	Provides the total number of <i>Extra Balls</i> awarded.
17	EXTRA BALLS PERCENT	Provides the percentage total by dividing Audit 16, TOTAL EXTRA BALLS , by Audit 28, TOTAL PLAYS .
18	REPLAY 1 AWARDS	Provides the total awards (<i>Credits, Extra Balls or Scores</i>) for Level 1.
19	REPLAY 2+ AWARDS	Provides the total awards (<i>Credits, Extra Balls or Scores</i>) for Level 2 or higher.
20	TOTAL REPLAYS	Provides the total awards (<i>Credits, Extra Balls or Scores</i>) for exceeding replay score levels.
21	REPLAY PERCENT	Provides the percentage total from dividing Audit 20, TOTAL REPLAYS , by Audit 28, TOTAL PLAYS . The percentage reflects replay total awards for exceeding replay score levels.
22	TOTAL SPECIALS	Provides the total Awards (<i>Credits, Extra Balls, or Scores</i>) for making <i>Specials</i> .
23	SPECIAL PERCENT	Provides the percentage total by dividing Audit 22, TOTAL SPECIALS , by Audit 28, TOTAL PLAYS .
24	TOTAL MATCHES	Provides the total <i>Credits</i> awarded for matching the last two digits of the score with the <i>System-Generated Match Number</i> at the end of the game. Percentage of <i>Match Credits</i> is adjustable from 0% to 10% by Adjustment 07, MATCH PERCENTAGE , if enabled. <i>See Section 3, Chapter 4, GO TO ADJUSTMENTS MENU, Standard Adjustments.</i>
25	HIGH SCORE AWARDS	Provides the total (<i>Credits, Extra Balls, or Scores</i>) awarded for exceeding the High-Score-To-Date scores.
26	HIGH SCORE PERCENT	Provides the percentage total by dividing Audit 25, HIGH SCORE AWARDS , by Audit 28, TOTAL PLAYS .
27	TOTAL FREE PLAYS	Provides the total <i>Free Credits</i> for <i>Replays, High-Score-To-Date, Specials and Match</i> .
28	TOTAL PLAYS	This total is derived by adding the sum of Audit 01, TOTAL PAID CREDITS , and Audit 27, TOTAL FREE PLAYS . (<i>Note that Free Credits are not recorded in the Audit until they are actually used.</i>)
29	0 - 3M SCORES	Provides the total number of games the Player's final score was between 0 and 2,999,990 points.
30	3M - 4M SCORES	Provides the total number of games the Player's final score was between 3,000,000 and 3,999,990 points.
31	4M - 5M SCORES	Provides the total number of games the Player's final score was between 4,000,000 and 4,999,990 points.
32	5M - 5.5M SCORES	Provides the total number of games the Player's final score was between 5,000,000 and 5,499,990 points.
33	5.5M - 6M SCORES	Provides the total number of games the Player's final score was between 5,500,000 and 5,999,990 points.
34	6M - 6.5M SCORES	Provides the total number of games the Player's final score was between 6,000,000 and 6,499,990 points.
35	6.5M - 7M SCORES	Provides the total number of games the Player's final score was between 6,500,000 and 6,999,990 points.
36	7M - 7.5M SCORES	Provides the total number of games the Player's final score was between 7,000,000 and 7,499,990 points.
37	7.5M - 8M SCORES	Provides the total number of games the Player's final score was between 7,500,000 and 7,999,990 points.
38	8M - 8.5M SCORES	Provides the total number of games the Player's final score was between 8,000,000 and 8,499,990 points.

Standard Audits 39-68 continued on the next page.





Standard Audits Continued.

Audit Name		Audit Definition
39	8.5M - 9M SCORES	Provides the total number of games the Player's final score was between 8,500,000 and 8,999,990 points.
40	9M - 9.5M SCORES	Provides the total number of games the Player's final score was between 9,000,000 and 9,499,990 points.
41	9.5M - 10M SCORES	Provides the total number of games the Player's final score was between 9,500,000 and 9,999,990 points.
42	10M - 12M SCORES	Provides the total number of games the Player's final score was between 10,000,000 and 11,999,990 points.
43	12M - 15M SCORES	Provides the total number of games the Player's final score was between 12,000,000 and 14,999,990 points.
44	15M - 20M SCORES	Provides the total number of games the Player's final score was between 15,000,000 and 19,999,990 points.
45	20M+ SCORES	Provides the total number of games the Player's final score was 20,000,000 points and over.
46	AVERAGE SCORES	This total is derived from adding the <i>Final Score</i> of each game to a table and dividing this sum by Audit 28, TOTAL PLAYS .
47	SERVICE CREDITS	Provides the total number of times the Portals™ Green Button (Dedicated Switch 7) was pushed in Attract Mode . <i>Note: For how to receive Service Credits, see Sec. 3, Chp. 1, Service Switch Set Access & Use. For how to delete Service (and Paid Credits), see Section 3, Chapter 6, GO TO RESET MENU, Reset Credits.</i>
48	BALL SEARCH STARTED	Provides the total number of times the game performed a <i>Ball Search</i> .
49	LOST BALL FEEDS	Provides the total number of times the game added a pinball to play when it could not find a pinball after <i>Ball Search</i> . See Sec. 3, Chp. 2, GO TO DIAGNOSTICS MENU, Technicians Alert [Pinball Detection] .
50	LOST BALL GAME STARTS	Provides the total number of times the game started with a pinball missing from the ball trough at the start of a game. See Sec. 3, Chp. 2, GO TO DIAGNOSTICS MENU, Technicians Alert [Pinball Detection] .
51	LEFT DRAINS	Provides the total number of times Rollover Switch 57 was closed.
52	CENTER DRAINS	Provides the total number of times the pinball had drained when the last switch closed was not Switch 57 or Switch 60.
53	RIGHT DRAINS	Provides the total number of times Rollover Switch 60 was closed.
54	TILTS	Provides the total number of times Contact Switch 56 was closed.
55	TOTAL BALLS SAVED	Provides the total number of times this feature was used (<i>this feature can be turned ON or OFF, see Adj. 37, FREEZE TIME in Section 3, Chp. 4, GO TO ADJUSTMENTS MENU, Standard Adjustments</i>). This feature is enabled at the start of each pinball and is disabled as soon as a predetermined number of switches are "closed" or the allocated time has expired.
56-63	PROPRIETARY	Proprietary Audits are used for Future Expansion or Programming .
64	BASE REPLAY	Provides the current base <i>Replay Level Score</i> .
65	LEFT FLIPPER USED	Provides the total number of times the Left Flipper Button (Dedicated Switch 1) was pushed in Game Mode .
66	RIGHT FLIPPER USED	Provides the total number of times the Right Flipper Button (Dedicated Switch 3) was pushed in Game Mode .
67-68	PROPRIETARY	Proprietary Audits are used for Future Expansion or Programming .

Comments or Notes:



Feature Audits (Programming Use Only) (69-172)

To initiate, from the **AUDITS MENU**, select the "PB" Icon with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. Select and activate either of the ">>" Mini-Icons to view the next or previous Audit in this group. The display will describe the Audit Number, Audit Name and the current Audit Total or Value. The current Audit will remain in the display until the next Audit is chosen or when the Sub-Menu is exited. **Audits Definition: Programming Use Only.** *The proprietary information provides the total number of times a feature was started, awarded, lit, played and/or completed (awarded); also, the total number of Switch Closures during certain modes or features are tracked (a predetermined single/multiple variations of switch closures are used to determine the lighting and/or completion of the feature stated).*

Aud. Nº	Audit Name	Aud. Nº	Audit Name
69	ADV. TOWARDS CTRFOLD MB	121	STRIP POKER CARDS
70	CTRFOLD MB LIT	122	STRIP POKER LIT
71	CTRFOLD MB STARTS	123	STRIP POKER STARTS
72	2+ CTRFOLD MB STARTS	124	2+ STRIP POKER STARTS
73	CTRFOLD MB JACKPOTS	125	STRIP POKER WINS
74	CTRFOLD MB 2X JPOT LIT	126	STRIP POKER LOSSES
75	CNTFOLD MB 2X JPOTS	127	STRIP POKER FOLDS
76	CTRFOLD MB 3X JPOT LIT	128	2 WAY COMBO (PHOTO LIT)
77	CTRFOLD MB 3X JPOTS	129	PHOTO SHOOT STARTS
78	RABBIT HEADS (LOOPS)	130	2+ PHOTO SHOOT STARTS
79	RABBIT HEADS (RT RAMP)	131	PHOTO SHOOT AWARDS
80	RABBIT HEADS (T. LANES)	132	PHOTO SHOOT COMPLETED
81	RABBIT HEADS (B. LANES)	133	SPLASH LETTERS
82	TOTAL RABBIT HEADS	134	SPLASH STARTS
83	0-50 RABBIT HEADS	135	2+ SPLASH STARTS
84	51-75 RABBIT HEADS	136	SPLASH AWARDS
85	76-100 RABBIT HEADS	137	N O T U S E D
86	101-150 RABBIT HEADS	138	GROTTO LIT
87	151-200 RABBIT HEADS	139	GROTTO AWARDS
88	201-250 RABBIT HEADS	140	N O T U S E D
89	251-300 RABBIT HEADS	141	EX. BALL LIT (P'MATES)
90	301-350 RABBIT HEADS	142	EX. BALL LIT (GROTTO)
91	351-400 RABBIT HEADS	143	SURPRISE PACKAGE LIT
92	401-500 RABBIT HEADS	144	TOTAL SP PKG AWARDS
93	501+ RABBIT HEADS	145	SP PKG CTRFOLD AWDS
94	P'MATES LIT (SPLASH)	146	SP PKG SPLASH AWDS
95	P'MATES LIT (PH. SHOOT)	147	SP PKG PH. SHOOT AWDS
96	P'MATES LIT (PEEK-A-B)	148	SP PKG TEASE AWDS
97	P'MATES LIT (TEASE)	149	SP PKG JPOT HURRY-UP
98	P'MATES LIT (RABBIT HD)	150	SP PKG PJ MBALL AWDS
99	P'MATES (MANSION MANIA)	151	SP PKG PJ H-U AWDS
100	5 P'MATES COLLECTED	152	BUNNY LOOPS LIT
101	6/7 P'MATES COLLECTED	153	BUNNY LOOP AWARDS
102	8/9 P'MATES COLLECTED	154	SKILL SHOTS MADE
103	10/11 6 P'MATES COLLECTED	155	JPOT H-U STARTS
104	12+ P'MATES COLLECTED	156	2+ JPOT H-U STARTS
105	MANSION MANIA STARTS	157	JPOT H-U AWARDS
106	2+ MANSION MANIA STARTS	158	LEFT ORBITS
107	MANSION MANIA JACKPOTS	159	RIGHT ORBITS
108	PJ PARTY H-U STARTS	160	LEFT RAMPS
109	2+ PJ PARTY H-U STARTS	161	CENTER RAMPS
110	PJ PARTY H-U AWARDS	162	RIGHT RAMPS
111	PJ PARTY MBALL AWARDS	163	PEEK-A-BOO HITS
112	BONUS X MAXED	164	BALL LOCK ARRIVALS
113	BONUS X AWARDS	165	LEFT RETURN LANES
114	TEASE STARTED	166	RIGHT RETURN LANES
115	2+ TEASE STARTED	167	DROP TARGET HITS
116	TEASE COMPLETED	168	POP BUMPER HITS
117	PEEK-A-BOO HITS	169	SURPRISE TARGET HITS
118	PEEK-A-BOO COMP.	170	GROTTO ARRIVALS
119	2+ PEEK-A-BOO COMP.	171	VUK ARRIVALS
120	PEEK-A-BOO AWARDS	172	TOP LANE ARRIVALS





Go To Printer Menu (OPTIONAL USE ONLY)

Operational Usage Note: The use of the following Sub-Menus are **OPTIONAL** and provided as a convenience only. **No special equipment or unique software (mentioned below) was included with your Pinball Game.** To initiate, from the **AUDITS MENU**, select the "PRNT" *Icon* with either the **Red** "LEFT" or **Green** "RIGHT" **Button** and press the **Black** "ENTER" **Button**. The **PRINTER MENU** appears. A **Printer Interface Board**, "Hand-Held" **Printer** & the **Alison Interface Program** are required for proper operation of these Sub-Menus. *Entering the menus & selecting/activating the Icons without the equipment mentioned, will not affect the Pinball Game nor the operation of the Portals™ Service Menu System in any way.* For information or details on the required equipment in this Menu, call or eMail Technical Support (contact info on the back cover).



Quick Printout

To initiate, from the **PRINTER MENU**, select the "QUIK" *Icon* with either the **Red** or **Green** **Button** and press the **Black** **Button**. Select either the "-" or "+" *Mini-Icon* and press the **Black** **Button** to start the printout. Per the display instruction, the **Start Button** can also be pressed to start the printout. Only the **Earnings Audits** can be retrieved and/or printed for further processing.



Full Printout

To initiate, from the **PRINTER MENU**, select the "ALISON" *Icon* with either the **Red** or **Green** **Button** and press the **Black** **Button**. Select either the "-" or "+" *Mini-Icon* and press the **Black** **Button** to start the download. Per the display instruction, the **Start Button** can also be pressed to start the download. All **Earnings, Standard & Feature Audits** can be retrieved and/or printed for further processing.



Reset Printer

To initiate, from the **PRINTER MENU**, select the "RESET" *Icon* with either the **Red** or **Green** **Button** and press the **Black** **Button**. Select either the "-" or "+" *Mini-Icon* and press the **Black** **Button** to clear the "Nº of copies printed" count total appearing in the display. **Operational Usage Note:** *Activating the "QUIK" Icon (in the previous Quick Printout) without the special equipment and unique software, will still provide a "count total" in this Reset Printer Menu, which does not affect the operation of the Portals™ Service Menu System in any way.* Activating this "RESET" *Icon* will reset the "count total" in the display to 00.

AUDIT ABBREVIATIONS USED IN THIS CHAPTER:

AWDS: Awards	COMP.: Completed	CTRFOLD: Centerfold	EX.: Extra	H-U: Hurry-Up	JPOTS: Jackpots
K: Thousand	M: Million	MB or MBALL: Multiball	P'MATES: Playmates	PEEK-A-B: Peek-A-Boo	PH.: Photo
PJ: Pajama	MANSION MANIA: Playmate of the Year	SH.: Shot	SP PKG: Surprise Package		

For how to **RESET** Audits, see **Section 3, Chapter 6, GO TO RESET MENU.**





ADJUSTMENT TABLE

PLAYBOY

STANDARD ADJUSTMENTS 01-46

ADJ	FE	ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING	ADJ	FE	ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING	ADJ	FE	ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING
		REPLAYS: FIXED/AUTO ‡					HIGH SCORE #4 AWARDS					EXTRA BALL PERCENTAGE		
01		... 12% ...			16		00			31		20%		
		REPLAY LEVELS ‡					HIGH SCORE #5 AWARDS					EXTRA BALL MEMORY		
02		1			17		00			32		ON		
		REPLAY AWARD					DEFAULT HIGH SCORE #1					SPECIAL PERCENTAGE		
03		CREDIT			18		50,000,000			33		2%		
		FREE GAME LIMIT					DEFAULT HIGH SCORE #2					SPECIAL MEMORY		
04		05			19		40,000,000			34		ON		
		EXTRA BALL LIMIT					DEFAULT HIGH SCORE #3					BILL VALIDATOR		
05		09			20		30,000,000			35		NO		
		GAME PRICING ‡					DEFAULT HIGH SCORE #4					BKGRND MUSIC VOLUME		
06		USA 5			21		20,000,000			36		01		
		MATCH PERCENTAGE					DEFAULT HIGH SCORE #5					FREEZE TIME		
07		8%			22		10,000,000			37		AUTO		
		BALLS PER GAME					HSTD RESET COUNT					UK POST SAVE ENABLED †		
08		03			23		2,000			38		NO		
		TILT WARNINGS					HIGH SCORE INITIALS					TIMED PLUNGER		
09		01			24		3 INITIALS			39		OFF		
		REPLAY BOOST					FREE PLAY					FLIPPER BALL LAUNCH		
10		YES			25		NO			40		DISABLED		
		CREDIT LIMIT					CUSTOM MESSAGE					COINDOOR BALL SAVER		
11		30			26		ON			41		NO		
		ALLOW HIGH SCORES					FLASH LAMP POWER					COMPETITION MODE		
12		YES			27		NORMAL			42		NO		
		HIGH SCORE #1 AWARDS					COIL PULSE POWER					CONSOLATION BALL		
13		01			28		NORMAL			43		YES		
		HIGH SCORE #2 AWARDS					KNOCKER VOLUME					PROPRIETARY		
14		00			29		NORMAL			44				
		HIGH SCORE #3 AWARDS					GAME RESTART					LOCATION ID		
15		00			30		YES			45		01		
												GAME ID		
										46		00		

‡ Adj. 01, 02 & 06 have a "Drop-Down" Table for further customization.

† Adj. 38 is utilized only for the UK (UK Dip Sw. Option Setting 2).

Note: If Game & Display ROMs other than USA are installed, along with the proper Dip Switch Settings, different Defaults will appear. If changes are made (or your Defaults are not USA), enter them with pencil in the **YOUR SETTING** spaces provided for reference.



Shortcut to Standard Adjustment 26.

FEATURE ADJUSTMENTS 47-64

ADJ	FE	ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING	ADJ	FE	ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING	ADJ	FE	ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING
		CENTERFOLD DIFFICULTY					PHOTO SHOOT DIFFICULTY					MAGAZINE ENABLED		
47		MODERATE			53		MODERATE			59		YES		
		PLAYMATES DIFFICULTY					STRIP POKER DIFFICULTY					PEEK-A-BOO ENABLED		
48		MODERATE			54		MODERATE			60		YES		
		PJ PARTY DIFFICULTY					MANSION MANIA DIFF.					ADULT CONTENT ENABLED		
49		MODERATE			55		MODERATE			61		DOTS&SOUNDSON		
		TEASE DIFFICULTY					STEPPER MOTOR ENABLED					# PLAYMATES FOR EB		
50		MODERATE			56		YES			62		09		
		SPLASH DIFFICULTY					CTRFOLD MOTOR ENABLED					FAST BONUS COUNTDOWN		
51		MODERATE			57		YES			63		NO		
		PEEK-A-BOO DIFFICULTY					TRIANGLE MTR ENABLED					PROPRIETARY		
52		MODERATE			58		YES			64		00		



Go To Adjustments Menu

Overview

The **Portals™ Service Menu System** provides **64** Adjustments to vary Game Functions to customize for your particular needs. The Adjustments are divided into 2 groups: • **Standard Adjustments (01-46)** and • **Feature Adjustments (47-64)**. Adjustments which are named **Proprietary** are also for **Future Expansion** or **Programming**. Game code may get upgraded during production; compare all Adjustments in the display with the manual and make any corrections to the Adjustment Table (*previous page*), as necessary. Adjustments are subject to change (*with or without notice*). To view Adjustments in the display, enter the **Portals™ Service Menu System**. When a change is made and then the next / previous Adjustment is selected (*or the Sub-Menu is exited*), the display will momentarily flash **REQUEST INSTALLED**. For **further customization of Game Play Difficulty** or **Game Play Type** or how to **RESET ONLY** the Adjustments, see **Sec. 3, Chp. 5, GO TO INSTALLS MENU**.



Important: The **Coin Door** must be **OPEN** allowing the **Memory Protect Switch** to be disabled, so any Adjustment changes can be made.



EXPLANATION & USAGE OF COMMON LARGE & MINI-ICONS USED IN VARIOUS MENUS & SUB-MENUS:



These **non-selectable** icons appear in the selected Menu only when there are **MORE** icons to the **LEFT** or to the **RIGHT** available for selection.



Select and activate to return to the **PREVIOUS** Menu.



Select and activate to **QUIT**, exits & returns to the **Attract Mode**.



Select and activate to view **HELP** Screens of the current Menu*.



Select and activate to:
Move **LEFT** or **RIGHT**, select previous / next or move backwards / forwards.
DECREMENT (-) or INCREMENT (+) displayed value or select previous / next.

* **Help Note:** An explanation of each Mini-Icon at that menu level will cycle continuously. To exit a display where no Mini-Icons are available for selection, pressing any button will exit the display.



GO TO ADJUSTMENTS MENU

After entering **Portals™**, the **MAIN MENU** now appears. Select the "ADJ" icon in the **MAIN MENU** with either the **Red "LEFT"** or **Green "RIGHT"** Buttons (the **Flipper Buttons** operates in the same manner) and press the **Black "ENTER"** Button (the **Start Button** operates in the same manner). The **ADJUSTMENTS MENU** appears. Continue through this chapter for the explanation & usage of the **Icons** in the **ADJUSTMENTS MENU**.



Standard Adjustments (01-46)

To initiate, from the **ADJUSTMENTS MENU**, select the "S.P.I." icon with either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. Select and activate either of the ">>" Mini-Icons to view the next or previous Adjustment in this group. Select and activate either of the "-" or "+" Mini-Icons to change the setting, if desired (*the Default Setting is noted in the definitions below*). The display will describe the Adjustment Number, the Adjustment Name and the current Adjustment Setting. The current Adjustment will remain in the display until the next Adjustment is chosen or when the Sub-Menu is exited.

Adj. N ^o	Adjustment Name	Adjustment Definition
01	REPLAYS: FIXED / AUTO	Set between 01% - 50% and Fixed (0%) for Replay Levels. Default is 12% . Four levels may be selected. Adjustments allow awarding of a credit or an extra ball as each level is exceeded. With the Autopercentage Feature , if the actual replay percentage is higher or lower than that desired, the game will automatically adjust for the new recommended percentage score(s).
02	REPLAY LEVELS	Set between 1 - 4 or NONE for the number of replay levels to be active. Default is 1 . A "Drop-Down" Table appears (after selection of number of replay levels) showing Replay Level 1. Adjust Replay Level 1 between 10M - 9.99B . Adjust Replay Level 2, 3 and/or 4 respectively.
03	REPLAY AWARD	Set to CREDIT, EXTRA BALL, NONE or SPECIAL . Default is CREDIT .
04	FREE GAME LIMIT	Set between 01 - 09 or NO FREE GAMES . Default is 05 . Set the maximum number of <i>Free Games</i> that may be accumulated per game.
05	EXTRA BALL LIMIT	Set between 01 - 09 or NO EXTRA BALLS . Default is 09 . Set the maximum number of <i>Extra Balls</i> that may be accumulated per game.

Standard Adjustment 06 continued on the next page.



Standard Adjustments Continued.

Adjustment Name

Adjustment Definition

06 GAME PRICING

There are two (2) methods available for *Coin Switch Programming*: **Standard & Custom**. Set between **USA 1** thru **EURO 12** or **CUSTOM**. *USA Factory Default Setting is **USA 5**.*

The Dip Switch Settings for the Country, which **must be changed** on the CPU/Sound Board for correct operation. For a **Standard** Selection (USA or International): Select & *activate* either of the "-" or "+" Mini-Icons to move backward or forward in the Display; With your choice appearing in the display, select & *activate* the ">>" Mini-Icon (to advance to **Adj. 7**) to "lock-in" change (*display will momentarily flash **REQUEST INSTALLED***).

If **CUSTOM** is selected (*appears in display*), after selecting & *activating* any Mini-Icon (*except for "-" or "+"*), the display will momentarily flash **REQUEST INSTALLED** with the display "**LEFT COIN: 0 PULSE**" appearing. Use the "<<" or ">>" Mini-Icons to **select** the next choice (*see Table Examples below*) and the "-" or "+" Mini-Icons to **customize** the PULSES, CREDITS & CLICKS from **0** to **99**.

The prescribed number of **PULSES** required for **1 CREDIT** must be set according to the **Pricing Scheme** desired. Some simple calculations are required to get the proper set-up. After customizing, **test the set-up** with appropriate Coins or Bills and adjust, if necessary. **Note:** *Clicks can be changed if an optional Coin Meter is installed.*

LEFT	CENTER	RIGHT	4TH	Example 1				LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:	ONE CREDIT:	BONUS 1:	BONUS 2:	BONUS 1:	BONUS 2:	LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:
25c	\$1.00	25c	Not Used	1 / 50c	2 / 75c	3 / \$1.00		3	12	3	1	4	0	0	0	0	1	4	1	1
Coin Mechanisms Used				Pricing Scheme Desired				PULSES	PULSES	PULSES	PULSE	PULSES	PULSES	PULSES	CREDITS	CREDITS	CLICK	CLICKS	CLICK	CLICK

In **Example 1**, note the **LEFT (and RIGHT) COIN: 3 PULSES** and **ONE CREDIT: 4 PULSES**. Since every Coin inserted produces 3 Pulses and every Credit requires 4 Pulses, 2 Coins (50c) will produce 6 Pulses (4 Pulses for the 1st Credit + 2 Pulses remains in "escrow"). The third Coin (75c) provides another 3 Pulses for a total of 5 Pulses (4 Pulses for the 2nd Credit + 1 Pulse remains in "escrow"). The fourth Coin (\$1.00) provides another 3 Pulses for a total of 4 Pulses (4 Pulses for the 3rd Credit + 0 Pulses remain). The **CENTER COIN: 12 PULSES** is set this way, because the Center Coin has a Bill Validator; every \$1 Bill inserted produces 12 Pulses or 3 Credits.

LEFT	CENTER	RIGHT	4TH	Example 2				LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:	ONE CREDIT:	BONUS 1:	BONUS 2:	BONUS 1:	BONUS 2:	LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:
25c	\$1.00	25c	Not Used	1 / 50c	2 / 75c	7 / \$2.00		3	12	3	1	4	24	0	1	0	1	4	1	1
Coin Mechanisms Used				Pricing Scheme Desired				PULSES	PULSES	PULSES	PULSE	PULSES	PULSES	PULSES	CREDIT	CREDITS	CLICK	CLICKS	CLICK	CLICK

In **Example 2**, similar to **Example 1**, however, **BONUS CREDITS** are implemented. In addition to receiving 3 plays for every \$1.00, the player is awarded an extra Credit for every 2nd dollar inserted before game start.

LEFT	CENTER	RIGHT	4TH	Example 3				LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:	ONE CREDIT:	BONUS 1:	BONUS 2:	BONUS 1:	BONUS 2:	LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:
25c	\$1.00	25c	Not Used	1 / 25c	6 / \$1.00	13 / \$2.00		5	20	5	0	4	20	40	1	0	1	4	1	1
Coin Mechanisms Used				Pricing Scheme Desired				PULSES	PULSES	PULSES	PULSES	PULSES	PULSES	PULSES	CREDIT	CREDITS	CLICK	CLICKS	CLICK	CLICK

In **Example 3**, a **Pricing Scheme** for a cheaper game is shown. An extra Pulse is put in escrow for every 25c, thus at 4X 25c inserted, another Credit is given, and the **BONUS 1: 20 PULSES** threshold is also met, so 6 / \$1.00 is achieved. **BONUS 2: 40 PULSES** is set, so when this threshold is met with \$2.00, 13 Credits are produced.

LEFT	CENTER	RIGHT	4TH	Example 4				LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:	ONE CREDIT:	BONUS 1:	BONUS 2:	BONUS 1:	BONUS 2:	LEFT COIN:	CENTER COIN:	RIGHT COIN:	FOURTH COIN:
10p	50p	£1	20p	1 / 30p	2 / 50p	5 / £1		1	6	15	2	3	0	0	0	0	1	4	1	1
Coin Mechanisms Used				Pricing Scheme Desired				PULSE	PULSES	PULSES	PULSES	PULSES	PULSES	PULSES	CREDITS	CREDITS	CLICK	CLICKS	CLICK	CLICK

In **Example 4**, a **Pricing Scheme** using a different currency (British Sterling) is shown to provide another way coins (or tokens) can be utilized to custom tailor to your own needs.

WARNING: Changes made in any Adjustments will be lost after a FACTORY RESET or removal of the CPU/Sound Board Batteries.

The **USA Standard Pricing Select Table** (*shown below*) and the **International Standard Pricing Select Table** (*shown next page*), details the following: 1. **Dip Switch** (Sw. 300) Setting **required** on the CPU/Sound Board. 2. **Country Setting Option(s)** 3. **Coin Mechanisms**: Money values which are typically used in the Left, Center, Right and 4th Coin Slot Switches. 4. **Pricing Scheme**: Number of plays or credits for the price amount shown.

USA Standard Pricing Select Table

CPU/SOUND BOARD DIP SWITCH 300 SETTING									COUNTRY SETTING OPTION(S)		COIN MECHANISMS (SWITCHES) COINS THRU ... SLOT: LEFT CENTER RIGHT 4TH				PRICING SCHEME Number of Plays (Credits) for Price Amount Shown See "Appendix J" for Coin Cards Examples & Info!			Requires SPI Coin Card(s) Part Number								
Pos.	1	2	3	4	5	6	7	8																		
ON									USA 1																	
OFF	▼	▼	▼	▼	▼	▼	▼	▼	USA 2																	
Note: The Country Setting Option for USA noted with "«" & "»" denotes the Factory Default Setting (subject to change).									USA 3																	
									USA 4																	
									USA 5	»	\$.25	\$ 1.00	\$.25	»	1 / \$.25										755-5400-01	
									USA 6						1 / \$.50			2 / \$.75		3 / \$1.00					755-5400-02	
									USA 7						1 / \$.50			For USA Defaults 6 & 7 use:							755-5400-02	
									USA 8						1 / \$.50			5 / \$2.00		755-5400-02					755-5400-00	
															1 / \$.50			2 / 4 X 25c		3 / \$1.00 Bill					◀ Used to promote the Bill Validator.	
															1 / \$.50			4 / \$1.50		6 / \$2.00					755-5400-00	
									1 / \$.50		3 / \$1.00															



International Standard Pricing Scheme Table

CPU/SOUND BOARD DIP SWITCH 300 SETTING		COUNTRY SETTING OPTION(S)	COIN MECHANISMS (SWITCHES) COINS THRU ... SLOT: LEFT CENTER RIGHT 4TH				PRICING SCHEME Number of Plays (Credits) for Price Amount Shown See "Appendix J" for Coin Cards Examples & Info!			Requires SPI Coin Card(s) Part Number
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Austria	€ .20	€ .50	€ 1.00	€ 2.00	1 /€ 1.00	2 /€ 1.50	3 /€ 2.00	755-5401-09
OFF	▼	Euro 9	optional							
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Australia 1	20¢	\$A1	\$A2		1 /\$A1	3 /\$A2		755-5406-00
OFF	▼	Australia 2					1 /\$A1			
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Belgium	€ .20	€ .50	€ 1.00	€ 2.00	1 /€ .50	5 /€ 2.00		755-5401-02
OFF	▼	Euro 2	optional							
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Canada	Can\$.25	Can\$.25	Can\$1	Can\$2	1 /50¢	2 /75¢	3/ Can\$1	755-5400-00 or -01 or -02
OFF	▼									
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Denmark 1	1 DKr	5 DKr	10 DKr	20 DKr	1 /3 DKr	2 /5 DKr		755-5402-00
OFF	▼	Denmark 2					1 /2 DKr	3 /5 DKr	7 /10 DKr	
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Finland	€ .20	€ .50	€ 1.00	€ 2.00	1 /€ 1.00	4 /€ 2.00		755-5401-11
OFF	▼	Euro 11	optional							
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	France	€ .20	€ .50	€ 1.00	€ 2.00	1 /€ 1.00	3 /€ 2.00	7 /€ 3.00	755-5401-10
OFF	▼	Euro 10	optional							
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Germany	€ .20	€ .50	€ 1.00	€ 2.00	1 /€ .50	5 /€ 2.00		755-5401-02
OFF	▼	Euro 2	optional							
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Greece	€ .20	€ .50	€ 1.00	€ 2.00	2 /€ .50			755-5401-06
OFF	▼	Euro 6	optional							
Pos.	1 2 3 4 5 6 7 8	Italy & Portugal Only: For different Euro Pricing Scheme (other than below settings), go to Adjustment 06 and scroll to Custom for this Unique Coin Door & Mech.								
ON	▲	Italy 1	€ .50		€ .50		1 /€ .50			755-5401-01 &
OFF	▼	Italy 2					1 /€ .50	3 /€ 2.00		755-5401-08
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Netherlands	€ .20	€ .50	€ 1.00	€ 2.00	1 /€ .50	3 /€ 1.00		755-5401-03
OFF	▼	Euro 3	optional							
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	New Zealand 1	\$NZ1		\$NZ2		1 /\$NZ1			755-5406-00
OFF	▼	New Zealand 2					1 /\$NZ1	3 /\$NZ2		
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Norway 1	10 NKr	5 NKr	20 NKr		1 /5 NKr			755-5403-00
OFF	▼	Norway 2					1 /10 NKr	3 /20 NKr		
Pos.	1 2 3 4 5 6 7 8	Italy & Portugal Only: For different Euro Pricing Scheme (other than below settings), go to Adjustment 06 and scroll to Custom for this Unique Coin Door & Mech.								
ON	▲	Portugal	€ .50		€ .50		1 /€ .50			755-5401-01
OFF	▼									
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Spain	€ .20	€ .50	€ 1.00	€ 2.00	1 /€ .50	3 /€ 1.00		755-5401-03
OFF	▼	Euro 3	optional							
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Sweden 1	1 SKr	5 SKr	10 SKr		1 /10 SKr	2 /15 SKr	3 /20 SKr	755-5404-00
OFF	▼	Sweden 2					1 /5 SKr			
Pos.	1 2 3 4 5 6 7 8	For different Euro Pricing Scheme (other than below default), go to Adjustment 06 and scroll through Euro 1-12 for new setting (see end of table Euro 1-12).								
ON	▲	Switzerland 1	1 SwF	2 SwF	5 SwF		1 /1 SwF	6 /5 SwF		755-5405-00
OFF	▼	Switzerland 2					1 /1 SwF	3 /2 SwF	9 /5 SwF	

Note: The Country Setting Option for Non-Euro Countries above noted with "«" & "»" denotes the Factory Default Setting (subject to change).

Pos.	1 2 3 4 5 6 7 8	LEFT	CENTER	RIGHT	4TH	5TH	UK also utilizes the 5th Coin Slot Switch (not available with Custom Pricing).			
ON	▲	UK 1					3 /£1	7 /£2		755-5407-00
OFF	▼	UK 2					4 /£1			755-5407-01*
		UK 3	10p	50p	£1	20p	1 /50p	5 /£2		755-5407-01
		UK 4					1 /30p	4 /£1		755-5407-01*
		UK 5	«			»	1 /£1	3 /£2		755-5407-00
		UK 6					3 /£2		*use blank side	755-5407-01*

Note: The Country Setting Option for Non-Euro Countries above noted with "«" & "»" denotes the Factory Default Setting (subject to change).

Pos.	1 2 3 4 5 6 7 8	Alternate Settings	LEFT	CENTER	RIGHT	4TH				
ON	S E E A B O V E	Euro 1					1 /€ .50			755-5401-01
OFF	S E T T I N G S	Euro 2					1 /€ .50	5 /€ 2.00		755-5401-02
		Euro 3					1 /€ .50	3 /€ 1.00		755-5401-03
		Euro 4					1 /€ .50	6 /€ 2.00		755-5401-04
		Euro 5					1 /€ .50	3 /€ 1.00	7 /€ 2.00	755-5401-05
		Euro 6	€ .20	€ .50	€ 1.00	€ 2.00	2 /€ .50			755-5401-06
		Euro 7	optional				1 /€ 1.00	5 /€ 4.00		755-5401-07
		Euro 8					1 /€ 1.00	3 /€ 2.00		755-5401-08
		Euro 9					1 /€ 1.00	2 /€ 1.50	3 /€ 2.00	755-5401-09
		Euro 10					1 /€ 1.00	3 /€ 2.00	7 /€ 3.00	755-5401-10
		Euro 11					1 /€ 1.00	4 /€ 2.00		755-5401-11
		Euro 12					2 /€ 1.00	9 /€ 4.00		755-5401-12

Euro 1-12 are alternate settings for above countries using the Euro:
If choosing an alternate Euro Setting other than your Country's Default, please remember to use your above noted Country Dip Switch Setting.

Standard Adj. 07-26 continued on the next page.



Standard Adjustments Continued.

Adjustment Name

Adjustment Definition

07 MATCH PERCENTAGE

Set between **0%** - **10%** or **OFF**. Default is **8%**. At **0%** the match display occurs at the end of the game but never awards a credit.

08 BALLS PER GAME

Set between **02** - **05**. Default is **03**. Set the number of balls per game.

09 TILT WARNINGS

Set to **00**, **01** or **03**. Default is **01**. Set the number of plumb bob tilt switch closures before the ball in play is tilted.

10 REPLAY BOOST

Set to **YES** or **NO**. Default is **YES**. When set to **YES**, exceeding a replay will set a temporary replay level for each time a replay level is surpassed. This new level will equal the previous replay level (*when the replay was awarded*) plus 50M for each following game, until the replays have all been played (*then the previous level is resumed*).

11 CREDIT LIMIT

Set between **04** - **50**. Default is **30**. Set the maximum credits allowed.

12 ALLOW HIGH SCORES

Set to **YES** or **NO**. Default is **YES**. When set to **YES** if a player exceeds any 1 of the 4 High Scores, the player may receive an award (*depending on Adj. 03, Replay Award*). Set to **NO** to disable this feature. There are 5 High Scores that will allow the player to enter their initials (*or name*) (see **Adj. 24, High Score Initials**).

13 HIGH SCORE #1 AWARDS

Set between **00** - **05**. Default is **01**. Set the number of awards, awarded for exceeding Level 1 (*the highest of the five (5) Levels*).

14 HIGH SCORE #2 AWARDS

Set between **00** - **03**. Default is **00**. Set the number of awards, awarded for exceeding Level 2.

15 HIGH SCORE #3 AWARDS

Set between **00** - **02**. Default is **00**. Set the number of awards, awarded for exceeding Level 3.

16 HIGH SCORE #4 AWARDS

Set between **00** - **01**. Default is **00**. Set the number of awards, awarded for exceeding Level 4.

17 HIGH SCORE #5 AWARDS

Set between **00** - **01**. Default is **00**. Set the number of awards, awarded for exceeding Level 5.

18 DEFAULT HIGH SCORE #1

Set between **1,000,000** - **9,999,000,000** or **00** (*increments of 1M*). Default is **50,000,000**. Set the desired **High Score Level** to which Level 1 may be achieved (*not affected by Adj. 23, HSTD Reset Count*).

19 DEFAULT HIGH SCORE #2

Set between **1,000,000** - **9,999,000,000** or **00** (*increments of 1M*). Default is **40,000,000**. Set the desired **High Score Level** to which Level 2 may be achieved (*not affected by Adj. 23, HSTD Reset Count*).

20 DEFAULT HIGH SCORE #3

Set between **1,000,000** - **9,999,000,000** or **00** (*increments of 1M*). Default is **30,000,000**. Set the desired **High Score Level** to which Level 3 may be achieved (*not affected by Adj. 23, HSTD Reset Count*).

21 DEFAULT HIGH SCORE #4

Set between **1,000,000** - **9,999,000,000** or **00** (*increments of 1M*). Default is **20,000,000**. Set the desired **High Score Level** to which Level 4 may be achieved (*not affected by Adj. 23, HSTD Reset Count*).

22 DEFAULT HIGH SCORE #5

Set between **1,000,000** - **9,999,000,000** or **00** (*increments of 1M*). Default is **10,000,000**. Set the desired **High Score Level** to which Level 5 may be achieved (*not affected by Adj. 23, HSTD Reset Count*).

23 HSTD RESET COUNT

Set between **100** - **9,900** or **OFF** (*increments of 100*). Default is **2,000**. **HSTD** (*High Score To Date*). Set the number of games between "automatic resets of high score levels" to "backup settings" and "ball time average" adjustments. Set to **OFF** for "no reset or adjustment".

24 HIGH SCORE INITIALS

Set to **3 INITIALS** or **10 LETTER**. Default is **3 INITIALS**. When set to **3 INITIALS**, the player is allowed only 3 initials to input. When set to **10 LETTER NAME**, the player is allowed to enter 10 initials to input.

25 FREE PLAY

Set to **YES** or **NO**. Default is **NO**. When set to **YES**, no coins are required for *Game Play*.

26 CUSTOM MESSAGE View the Custom Message Shortcut summary (end of this chapter) for how to enter text or symbols.

Set to **ON**, **CHANGE** or **OFF**. Default is **ON**. When set to **CHANGE** (*select the "+" Mini-Icon to change settings until "CHANGE" appears in the display, then select the ">>" Mini-Icon to access*.) This adjustment can be accessed in two (2) ways by either selecting the "S.P.I." *Icon* and advancing to this Adjustment, **or** can be directly accessed by selecting the "ABCD CUST MSG" *Icon* in the **ADJUSTMENTS MENU**.

Standard Adjustments 27-41 continued on the next page.





Standard Adjustments Continued.

	Adjustment Name	Adjustment Definition
27	FLASH LAMP POWER	Set to NORMAL , DIM or OFF . Default is NORMAL . When set to DIM , the Flash Lamps impulse power is reduced by 25% and when set to OFF the Flash Lamps will not flash.
28	COIL PULSE POWER	Set to NORMAL , HARD or SOFT . Default is NORMAL . When set to HARD , the coil pulse power is increased by 12.5% of the normal pulse rate. When set to SOFT the coil pulse power is decreased by 12.5% of the normal pulse rate. This adj. is provided to compensate for <i>Low Line</i> or <i>High Line voltage</i> conditions where the solenoids (coils) appear to <i>kicking too weak or too hard</i> . Adjust as required.
29	KNOCKER VOLUME	Set to NORMAL , LOW or OFF . Default is NORMAL . When set to LOW , the volume is decreased 50%. When set to OFF , no sound is heard when the "knocker" is sounded.
30	GAME RESTART	Set to YES or NO . Default is YES . When set to YES , a new game may be started during any ball after the first ball is completed (<i>if credits are available</i>). Pressing the Start Button during the first ball will add additional players. When set to NO , the game disables the Start Button after the first ball until the final ball is in play. <i>Review Section 2, Chapter 1, Game Operations & Features for details.</i>
31	EXTRA BALL PERCENTAGE	Set between 0% - 50% . Default is 20% . This adjustment allows the operator to adjust how frequently the Extra Ball Feature is made available to the player.
32	EXTRA BALL MEMORY	Set to ON or OFF . Default is ON . When set to ON , this feature bonus will be retained in memory from ball-to-ball for the same player. When set to OFF , this feature will go out at the end of each ball.
33	SPECIAL PERCENTAGE	Set between 0% - 5% . Default is 2% . This adjustment allows the operator to adjust how frequently the Special Feature is made available to the player.
34	SPECIAL MEMORY	Set to ON or OFF . Default is ON . When set to ON , this feature bonus will be retained in memory from ball-to-ball for the same player. When set to OFF , this feature will go out at the end of each ball.
35	BILL VALIDATOR	Set to YES or NO . Default is NO . When set to YES , in <i>Game Attract Mode</i> the Display will show an " <i>Insert Bill Animation</i> ." When set to NO , the Display will show an " <i>Insert Coin Animation</i> ."
36	BKGRND (BACKGROUND) MUSIC VOLUME	Set between 01 - 15 . Default is 01 . After volume is set via Portals Service Buttons (<i>see Sec. 3, Chp. 1,...Intro</i>) this adjustment can be utilized to adjust the background music (<i>1 all the way on, 15 all the way off</i>) while keeping the Special Sound FX the same level.
37	FREEZE TIME (BALL SAVE)	Set to OFF , 0:01-0:15 or AUTO . Default is AUTO . When set to OFF this feature is unavailable. Set between 0:01 through 0:15 (<i>single increments</i>) for the ball to be sent back into play if the time set is not met (<i>per ball</i>). Set to AUTO to automatically adjust the Freeze Timer based on the average ball time.
38	UK POST SAVE ENABLED	////////// UK Only Dip Switch Must Be Set ////////// Set to YES or NO . Default is NO , (<i>UK Default is YES</i>). When set to YES this feature is available when lit. Set to NO to disable this feature. (<i>UK Games have Outlane/Center Post Save Devices which are accessed in differently; Non-UK Games cannot adjust this setting.</i>)
39	TIMED PLUNGER	Set to OFF or 0:15 - 1:00 . Default is OFF . When set to 0:15 to 1:00 , the plunger will "Autoplunge" the ball (<i>at the time set</i>) when the ball is at the beginning of play, awaiting the skill shot by the player.
40	FLIPPER BALL LAUNCH	Set to DISABLED , LEFT FLIPPER , RIGHT FLIPPER , EITHER FLIPPER or BOTH FLIPPERS . Default is DISABLED . This feature allows the player to operate the <i>Auto Ball Launch</i> with the FLIPPER BUTTON(S) depending on which setting is chosen.
41	COINDOOR BALL SAVER	Set to YES or NO . Default is NO . When set to NO , this feature is not available. When set to YES , this feature allows the Coin Door to be opened during game play; the ball will drain but the game will be placed "on hold". When the Coin Door is closed, the pinball will return to the Shooter Lane, and the game will resume.

Standard Adjustments 42-46 continued on the next page.



Standard Adjustments Continued.

Adjustment Name	Adjustment Definition
42 COMPETITION MODE	Set to YES or NO . Default is NO . When set to NO , this feature is not available. If an Install of either \$.50 or Free Play Competition was made (<i>changing the default to YES</i>), and was changed back to NO , the COMPETITION MODE will be turned OFF (<i>see Sec. 3, Chp. 5, GO TO INSTALLS MENU, \$. 50 or Free Play Competition</i>). Set to YES , this feature is available (<i>required for Competition Modes</i>); this feature will equalize random game features and global score values during multi-player games.
43 CONSOLATION BALL	Set to YES or NO . Default is YES . When set to YES , the EXTRA BALL (<i>Playfield Light Insert</i>) will be lit on the last ball in play, if certain programming criteria is met.
44 PROPRIETARY	Proprietary Adjustments are used for Future Expansion or Programming .
45 LOCATION ID	Set between 00 to 9999 . Default is 00 . This adjustment allows the operator to assign a location identification number to the audit print-out sheet. (<i>Will not be affected by Factory Reset.</i>)
46 GAME ID	Set between 00 to 9999 . Default is 00 . This adjustment allows the operator to assign a game identification number to the audit print-out sheet. (<i>Will not be affected by Factory Reset.</i>)



Feature Adjustments (47-64)

To initiate, from the **ADJUSTMENTS MENU**, select the "PB" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Adjustment in this group. Select and *activate* either of the "-" or "+" *Mini-Icons* to change the setting, if desired (*the Default Setting is noted in the definitions below*). The display will describe the Adjustment Number, the Adjustment Name and the current Adjustment Setting. The current Adjustment will remain in the display until the next Adjustment is chosen or when the Sub-Menu is exited.

Adj. N ^o	Adjustment Name	Adjustment Definition
47	CENTERFOLD DIFFICULTY	
48	PLAYMATES DIFFICULTY	
49	PJ PARTY DIFFICULTY	
50	TEASE DIFFICULTY	
51	SPLASH DIFFICULTY	Set to EXEASY , EASY , MODERATE , HARD or EXHARD . Default is MODERATE . Determines how this Feature is started and played.
52	PEEK-A-BOO DIFFICULTY	
53	PHOTO SHOOT DIFFICULTY	
54	STRIP POKER DIFFICULTY	
55	MANSION MANIA DIFF.	
56	STEPPER MOTOR ENABLED (BACKPANEL DROP SCREEN)	Set to YES or NO . Default is YES . When set to YES , the Drop Screen Stepper Motor (Q19, Q20, Q21 & Q22) is operational. When set to NO , the Stepper Motor is disabled. Change setting to NO if any of the following is malfunctioning or is awaiting service and/or repair: Stepper Motor (Q19, Q20, Q21 & Q22) and/or Switch 52 . <i>Game programming is automatically changed to accomodate player.</i>

Feature Adjustments 57-64 continued on the next page.





Feature Adjustments Continued.

	Adjustment Name	Adjustment Definition
57	CTRFOLD (CENTERFOLD) MOTOR ENABLED	Set to YES or NO . Default is YES . When set to YES , the DC Bi-Directional Relay Board (Q31 & Q32) for the Centerfold Motor is operational. When set to NO , the Bi-Directional Relay Board is disabled. Change setting to NO if any of the following is malfunctioning or is awaiting service and/or repair: Bi-Directional Relay Board (Q31 & Q32) , Centerfold Motor and/or Sw. 43 & 44 . <i>Game programming is automatically changed to accomodate player.</i>
58	TRIANGLE MTR (MOTOR) ENABLED (ROTATING TRIANGLE BILLBOARD)	Set to YES or NO . Default is YES . When set to YES , the Relay Board (Q22) for the Rotating Triangle Billboard Motor is operational. When set to NO , the Relay Board is disabled. Change setting to NO if any of the following is malfunctioning or is awaiting service and/or repair: Relay Board (Q22) , Rotating Triangle Billboard Motor and/or Switches 29 & 30 . <i>Game programming is automatically changed to accomodate player.</i>
59	MAGAZINE ENABLED	Set to YES or NO . Default is YES . When set to YES , the Magazine Assembly (Q14) is operational. When set to NO , the Coil (Q14) is disabled. Change setting to NO if any of the following is malfunctioning or is awaiting service and/or repair: Coil (Q14) . <i>Game programming is automatically changed to accomodate player.</i>
60	PEEK-A-BOO ENABLED (BEADED SCREEN)	Set to YES or NO . Default is YES . When set to YES , the Peek-A-Boo Beaded Assembly (Q7 & Q8) is operational. When set to NO , the Coils (Q7 & Q8) are disabled. Change setting to NO if any of the following is malfunctioning or is awaiting service and/or repair: Coil (Q7) and/or Coil (Q8) . <i>Game programming is automatically changed to accomodate player.</i>
61	ADULT CONTENT ENABLED	Set to DOTS & SOUNDS OFF , DOTS & SOUNDS ON , DOTS ON or SOUNDS ON . Default is DOTS & SOUNDS ON . Set to DOTS & SOUNDS OFF to disable "adult content" in both audible (sounds and/or words) & visual (dot display graphics). To disable only the visual, select DOTS OFF . To disable only the sounds, select SOUNDS OFF .
62	# PLAYMATES FOR EB (EXTRA BALL)	Set to 02 through 11 . Default is 09 . The <i>Extra Ball Feature</i> will be turned off after the amount set (<i>equals the number of Game Modes Played</i>) is acheived.
63	FAST BONUS COUNTDOWN	Set to YES or NO . Default is NO . When set to NO , this feature is not available. When set to YES , this feature is available.
64	PROPRIETARY	Proprietary Adjustments are used for <i>Future Expansion</i> or <i>Programming</i> .

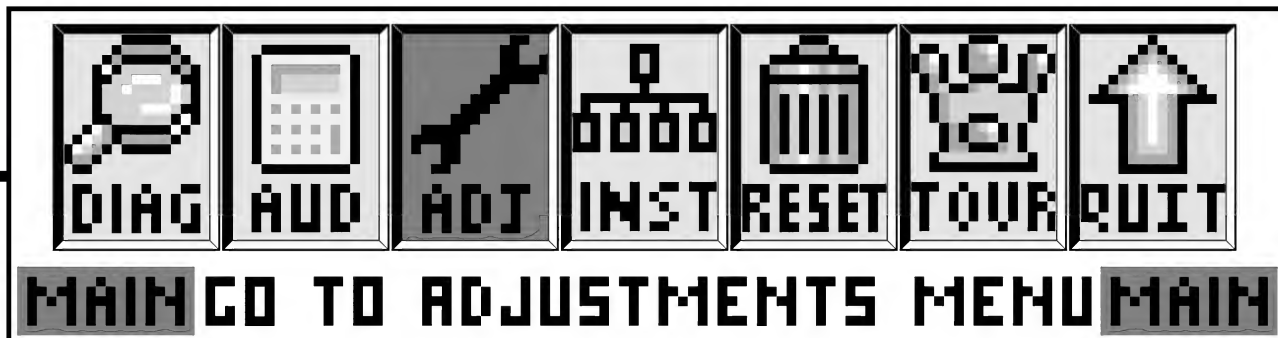
For further customization of Game Play Difficulty or Game Play Type or how to **RESET ONLY** the Adjustments, see Section 3, Chapter 5, **GO TO INSTALLS MENU**.





Custom Message

To go directly to **Adjustment 26, Custom Message**, from the **ADJUSTMENT MENU**, select the "CUST MSG" *Icon* either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. At the top left corner of the Display, the letter **A** is indicated (*blinking*) in the first available position (*Thirty-Six (36) characters including spaces are available*). Vary the letter(s) by operating the Left and Right Flipper Buttons (or "**RED**" or "**GREEN**" Buttons). With the desired letter indicated, depress the **Start Button** to lock in the letter and advance to the next character. Repeat this procedure until the desired message is completed in the display. Select the "<" or ">" characters to back-space (*erase*) and/or to move forward in an already typed message. After completion, press the "**BLACK**" Button, "**REQUEST INSTALLED**" is indicated and then exits this sub-menu.



Sec. 3: Adjustments



For further customization of Game Play Difficulty or Game Play Type or how to **RESET ONLY** the Adjustments, see **Section 3, Chapter 5, GO TO INSTALLS MENU**.



Go To Installs Menu

Overview

The **Portals™ Service Menu System** provides **14 Installs** to vary **Game Play Difficulty** or **Game Play Type** and **Install Factory**.



Important: The **Coin Door** must be **OPEN** allowing the **Memory Protect Switch** to be disabled, so any **Install** changes can be made.



For **detailed customization** or to check current **Adjustments Defaults** (either changed by **YOU** in the **Adjustments Menu** or by this **Installs Menu** or for **Factory Default Settings**), see **Section 3, Chapter 4, GO TO ADJUSTMENTS MENU**. **Important: Before preceding**, write down any **previously changed Adjustment Defaults**. After completing one or more of the **Installs** in this Chapter, go back to the **ADJUSTMENTS MENU** to see which **Standard and/or Feature Adjustments** have changed (*Feature Adjustment and/or settings are subject to change during production, and may differ than what is described in the tables below each Install explanation*). If the settings are not to your liking, perform one of the following:

1.: Manually change the **Standard & Feature Adjustments Settings** (perform task in the **Adjustments Menu**).

or

2.: Install Factory to reset all of the **Standard & Feature Adjustments** back to the **Factory Default Settings**, (see the end of this chapter).

Multiple **Installs** can be set to vary game play; however, for **Installs** that have *one or more* **Adjustments** in common, the **last** "Install" selected & **activated**, will **supersede** any previously changed **Adjustment(s)** from any prior **Installs**.

For example, if you want a **5-BALL Game** set to **EXTRA EASY**: Select and **activate** the "5BAL" **Icon** first (which will typically change any **Feature** Difficulty Adjustments to **HARD**), then select & **activate** the "X.EZ" **Icon** to **change back** the Difficulty Adjustments to **EXTRA EASY**. However, if the "X.EZ" **Icon** was selected & **activated** first, then the "5BAL" **Icon** was selected & **activated**, the game will be set to a **5-BALL Game** set to **HARD**.

EXPLANATION & USAGE OF COMMON LARGE ICONS USED IN THIS MENU:



These **non-selectable Icons** appear in the selected **Menu** only when there are **MORE** Icons to the **LEFT** or to the **RIGHT** available for selection.



Select and **activate** to return to the **PREVIOUS** **Menu**.



Select and **activate** to **QUIT**, exits & returns to the **Attract Mode**.



Select and **activate** to view **HELP** Screens of the current **Menu***.

WARNING:
Selection & activation of the "Install Factory" **Icon**, will change all **Adjustments & Installs** to the **Factory Default**!

* **Help Note:** An explanation of each **Icon** at that **menu level** will cycle continuously. To exit a display where no **Icons** are available for selection, pressing any button will exit the display.



GO TO INSTALLS MENU

After entering **Portals™**, the **MAIN MENU** now appears. Select the "INST" **Icon** in the **MAIN MENU** with either the **Red "LEFT"** or **Green "RIGHT"** **Buttons** (the **Flipper Buttons** operates in the same manner) and press the **Black "ENTER"** **Button** (the **Start Button** operates in the same manner). The **INSTALLS MENU** appears. Continue through this chapter for the explanation & usage of the **Icons** in the **INSTALLS MENU**.



Install Extra Easy

To initiate, from the **INSTALLS MENU**, select the "X.EZ" **Icon** with either the **Red "LEFT"** or **Green "RIGHT"** **Buttons** and press the **Black "ENTER"** **Button**. **Game Play Difficulty** is set to **EXTRA EASY**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "X.EZ" **Icon** flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

NONE		
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FEATURE ADJUSTMENTS NEW SETTINGS*:

47-55	... DIFFICULTY	EXTRA EASY
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* *Feature Adjustments and/or settings are subject to change.*



Install Easy

To initiate, from the **INSTALLS MENU**, select the "EASY" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. **Game Play Difficulty** is set to **EASY**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "EASY" *Icon*

flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

NONE		
------	--	--

FEATURE ADJUSTMENTS NEW SETTINGS*:

47-55	... DIFFICULTY	EASY
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* Feature Adjustments and/or settings are subject to change.



Install Normal

To initiate, from the **INSTALLS MENU**, select the "FACT" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. **Game Play Difficulty** is set to **MODERATE**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "FACT" *Icon* flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

NONE		
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FEATURE ADJUSTMENTS NEW SETTINGS*:

47-55	... DIFFICULTY	MODERATE
-------	----------------	----------

* Feature Adjustments and/or settings are subject to change.



Install Hard

To initiate, from the **INSTALLS MENU**, select the "HARD" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. **Game Play Difficulty** is set to **HARD**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "HARD" *Icon*

flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

NONE		
------	--	--

FEATURE ADJUSTMENTS NEW SETTINGS*:

47-55	... DIFFICULTY	HARD
-------	----------------	------

* Feature Adjustments and/or settings are subject to change.



Install Extra Hard

To initiate, from the **INSTALLS MENU**, select the "X.HD" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. **Game Play Difficulty** is set to **EXTRA HARD**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "X.HD" *Icon*

flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

NONE		
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FEATURE ADJUSTMENTS NEW SETTINGS*:

47-55	... DIFFICULTY	EXTRA HARD
-------	----------------	------------

* Feature Adjustments and/or settings are subject to change.



Install 3-Ball

To initiate, from the **INSTALLS MENU**, select the "3BAL" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. **Game Play Type** is set to **3-BALL PLAY**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "3BAL" *Icon* flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

08	BALLS PER GAME	03
----	----------------	----

FEATURE ADJUSTMENTS NEW SETTINGS*:

47-55	... DIFFICULTY	MODERATE
-------	----------------	----------

* Feature Adjustments and/or settings are subject to change.





Install 5-Ball

To initiate, from the **INSTALLS MENU**, select the "5BAL" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Type** is set to **5-BALL PLAY**. **"REQUEST INSTALLED"** is indicated and returns to the **INSTALLS MENU** with the "5BAL" *Icon* flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

08	BALLS PER GAME	05
----	----------------	----

FEATURE ADJUSTMENTS NEW SETTINGS*:

47-55	... DIFFICULTY	HARD
-------	----------------	------

* Feature Adjustments and/or settings are subject to change.



\$.50 Competition (a.k.a. IFPA)

To initiate, from the **INSTALLS MENU**, select the "PAY" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Type** is set to **TOURNAMENT PAY MODE**. **"REQUEST INSTALLED"** is indicated and returns to the **INSTALLS MENU** with the "PAY" *Icon* flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

06	GAME PRICING	USA 5
09	TILT WARNINGS	02
25	FREE PLAY	NO
30	GAME RESTART	NO
41 (Note 1)	COINDOOR BALL SAVER	(YES) (Note 1)
42 (Note 2)	COMPETITION MODE	YES (Note 2)

FEATURE ADJUSTMENTS NEW SETTINGS*:

NONE		
------	--	--

Note 1: Adjustment 41 Default **will not change**; Installing \$.50 Competition will override this Adjustment regardless of the setting.

Note 2: If Adjustment 42 is changed back to NO after this Install, the Competition Mode Install will be canceled (turned off).

If Competition Mode was set, it is suggested to "Install Factory" to restore all Adjustments (Factory Default); then to recustomize, if desired.



Free Play Competition (a.k.a. EXPO or PAPA)

To initiate, from the **INSTALLS MENU**, select the "FREE" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Type** is set to **TOURNAMENT FREE MODE**. **"REQUEST INSTALLED"** is indicated and returns to the **INSTALLS MENU** with the "FREE" *Icon* flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

09	TILT WARNINGS	02
25	FREE PLAY	YES
30	GAME RESTART	NO
41 (Note 1)	COINDOOR BALL SAVER	(YES) (Note 1)
42 (Note 2)	COMPETITION MODE	YES (Note 2)

FEATURE ADJUSTMENTS NEW SETTINGS:

NONE		
------	--	--

Note 1: Adjustment 41 Default **will not change**; Installing \$.50 Competition will override this Adjustment regardless of the setting.

Note 2: If Adjustment 42 is changed back to NO after this Install, the Competition Mode Install will be canceled (turned off).

If Competition Mode was set, it is suggested to "Install Factory" to restore all Adjustments (Factory Default); then to recustomize, if desired.



Install Home Play

To initiate, from the **INSTALLS MENU**, select the "HOME" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. **Game Play Type** is set to **NORMAL HOME PLAY**. **"REQUEST INSTALLED"** is indicated and returns to the **INSTALLS MENU** with the "HOME" *Icon* flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

05	EXTRA BALL LIMIT	09
07	MATCH PERCENTAGE	10%
25	FREE PLAY	YES
31	EXTRA BALL PERCENTAGE	30%
41	COINDOOR BALL SAVER	YES

FEATURE ADJUSTMENTS NEW SETTINGS:

NONE		
------	--	--



Film Star Reset

To initiate, from the **INSTALLS MENU**, select the "STAR" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. Game Play Type is set to **EASY HOME PLAY**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "STAR" *Icon* flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

05	EXTRA BALL LIMIT	09
25	FREE PLAY	YES
41	COINDOOR BALL SAVER	YES

FEATURE ADJUSTMENTS NEW SETTINGS*:

47-55	... DIFFICULTY	EASY
-------	----------------	------

* Feature Adjustment and/or settings are subject to change.



Install Novelty

This setting is recommended where **local laws restrict certain game features**.

To initiate, from the **INSTALLS MENU**, select the "NOV" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. Game Play Type is set to **RESTRICTED PLAY**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "NOV" *Icon* flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

01	REPLAYS: FIXED/AUTO	FIXED (0%)
02	REPLAY LEVELS	NONE
03	REPLAY AWARD	NONE
04	FREE GAME LIMIT	NO FREE GAMES
05	EXTRA BALL LIMIT	NO EXTRA BALLS
07	MATCH PERCENTAGE	OFF
10	REPLAY BOOST	NO
13-17	HIGH SCORE ... AWARDS	00

FEATURE ADJUSTMENTS NEW SETTINGS*:

NONE		
------	--	--

Sec. 3: Go To Installs



Install Add-A-Ball

This setting is recommended where **local laws restrict certain game features**.

To initiate, from the **INSTALLS MENU**, select the "A.A.B" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. Game Play Type is set to **RESTRICTED PLAY**. "REQUEST INSTALLED" is indicated and returns to the **INSTALLS MENU** with the "A.A.B" *Icon* flashing.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

03	REPLAY AWARD	EXTRA BALL
04	FREE GAME LIMIT	NO FREE GAMES
05	EXTRA BALL LIMIT	09
07	MATCH PERCENTAGE	OFF
13-17	HIGH SCORE ... AWARDS	00

FEATURE ADJUSTMENTS NEW SETTINGS*:

NONE		
------	--	--



Install Factory (ONLY affects all Adjustments/Installs)

To initiate, from the **INSTALLS MENU**, select the "FACT" *Icon* with either the Red "LT" or Green "RT" Buttons and press the Black "ENT" Button. ⚠ All Installs will be reset to the **Factory Default Settings**. "REQUEST INSTALLED" is indicated and the **Service Menu** is exited, returning to the **Attract Mode**.

STANDARD ADJUSTMENT(S) NEW SETTINGS:

01-46	ALL STANDARD ADJ.	FACTORY DEFAULTS
-------	-------------------	------------------

FEATURE ADJUSTMENTS NEW SETTINGS*:

47-64	ALL FEATURE ADJ.	FACTORY DEFAULTS
-------	------------------	------------------

If Competition Mode was set, it is suggested to "Install Factory" to restore all Adjustments (Factory Default); then to recustomize, if desired.



For how to **RESET Audits** (also can **RESET High Scores, Credits or Reset All Adjustments**) see **Section 3, Chapter 6, GO TO RESET MENU**.



Go To Reset Menu

Overview

The **Portals™ Service Menu System** provides five (5) functions to reset **Coin & Game Audits, High Scores, Credits** or to reset **ALL AUDITS, ADJUSTMENTS & INSTALLS** back to the **Factory Default Settings**.



Important: The **Coin Door** must be **OPEN** allowing the **Memory Protect Switch** to be disabled, so any **Reset** changes can be made.



EXPLANATION & USAGE OF COMMON LARGE ICONS USED IN THIS MENU:



These **non-selectable** icons appear in the selected Menu only when there are **MORE** icons to the **LEFT** or to the **RIGHT** available for selection.



Select and activate to return to the **PREVIOUS** Menu.



Select and activate to **QUIT**, exits & returns to the **Attract Mode**.



Select and activate to view **HELP** Screens of the current Menu*.

WARNING:
As soon as any **Reset Icon** is selected & activated, the information associated with the **Reset Icon**, is lost!

* **Help Note:** An explanation of each icon at that menu level will cycle continuously. To exit a display where no icons are available for selection, pressing any button will exit the display.



GO TO RESET MENU

After entering **Portals™**, the **MAIN MENU** now appears. Select the "**RESET**" icon in the **MAIN MENU** with either the **Red "LEFT"** or **Green "RIGHT"** Buttons (the **Flipper Buttons** operates in the same manner) and press the **Black "ENTER"** Button (the **Start Button** operates in the same manner). The **RESET MENU** appears. Continue below for the explanation & usage of the icons in the **RESET MENU**.



Reset Coin Audits

To initiate, from the **RESET MENU**, select the "**COIN**" icon with either the **Red** or **Green Buttons** and press the **Black Button**. **ONLY** the **Coin Audits (05-13)** will be reset to zero (0), **Factory Default Settings**. "**REQUEST INSTALLED**" is indicated and returns to the **RESET MENU** with the "**COIN**" icon flashing.



Reset Game Audits

To initiate, from the **RESET MENU**, select the "**AUD**" icon with either the **Red** or **Green Buttons** and press the **Black Button**. **ONLY** the **Game Audits (01-04 and 15-Last Audit)** will be reset to zero (0), **Factory Default Settings**. **Note:** **Coin Audits (05-13) & Software Meter Audit (14)** will not be reset. "**REQUEST INSTALLED**" is indicated and returns to the **RESET MENU** with the "**AUD**" icon flashing. **Tournament Note:** **Tourn. Audits can only be reset** if a new **Tournament** is started or a **Factory Reset** is done.



Reset High Scores

To initiate, from the **RESET MENU**, select the "**HSTD**" icon with either the **Red** or **Green Buttons** and press the **Black Button**. **ONLY** the **High Scores** will be reset to the current values. **Note:** If these five (5) adjustments were not personally changed by you, the **Factory Default Settings** will be used (see **Section 3, Chapter 4, GO TO ADJUSTMENTS MENU, Standard Adjustments 18-22**). "**REQUEST INSTALLED**" is indicated and returns to the **RESET MENU** with the "**HSTD**" icon flashing.



Reset Credits

To initiate, from the **RESET MENU**, select the "**CRED**" icon with either the **Red** or **Green Buttons** and press the **Black Button**. **All Credits** will be reset to zero (0), **Factory Default Settings**. "**REQUEST INSTALLED**" is indicated and returns to the **RESET MENU** with the "**CRED**" icon flashing.

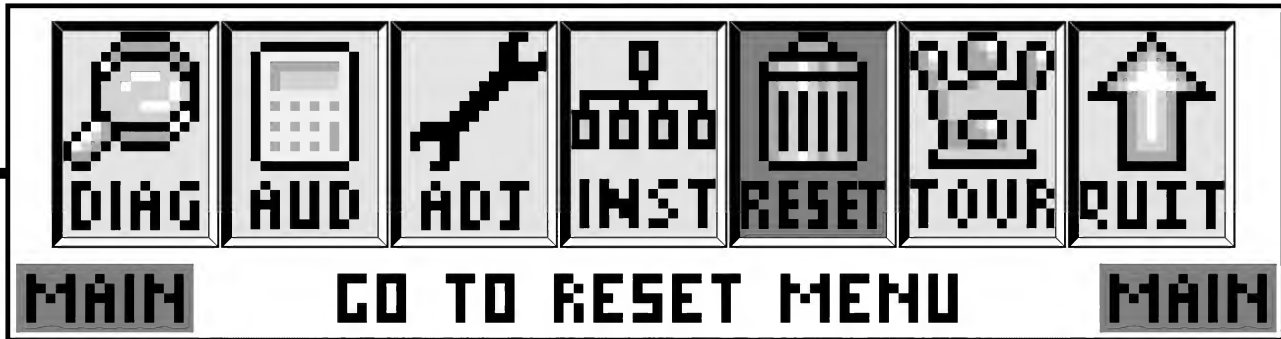


Factory Reset

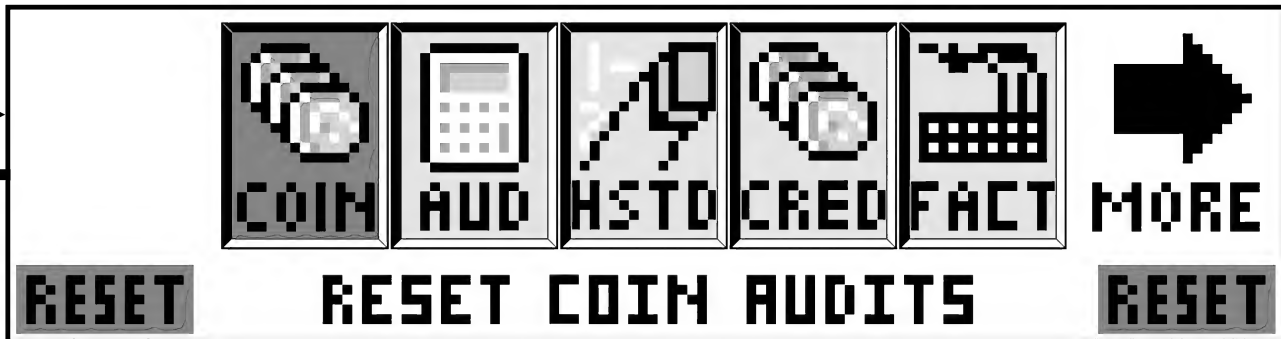
To initiate, from the **RESET MENU**, select the "**FACT**" icon with either the **Red** or **Green Buttons** and press the **Black Button**. **All Audits (except for Audit 14, Software Meter), Adjustments, Installs, Tournament Audits** and all **Tournament Adjustments (including Sign Messages A-B)**, will be reset to the **Factory Default Settings**. **Note:** To **RESET ONLY** the **ADJUSTMENTS & INSTALLS (leaving all the Regular Audits alone)**, see **Section 3, Chapter 5, GO TO INSTALLS MENU, Install Factory**. "**REQUEST INSTALLED**" is indicated and the **Service Menu** is exited, returning to the **Attract Mode**.

Example:

After entering **Portals™**, the **MAIN MENU** now appears. Use the Red "LEFT" or Green "RIGHT" Buttons to select the "RESET" *Icon* (GO TO RESET MENU).



Press the Black "ENTER" Button to *activate* this **ICON**. The **RESET MENU** now appears with the "COIN" *Icon* (RESET COIN AUDITS) flashing:



From the **RESET MENU**, select any of the *Icons* ("COIN", "AUD", "HSTD", "CRED") with either the Red or Green Buttons and press the Black Button to *activate* the **ICON** chosen. After the **ICON** is selected & *activated*, "REQUEST INSTALLED" is indicated and is returned to the **RESET MENU** with the previously selected *Icon* flashing.

Important:



AT THIS TIME, **DO NOT** PRESS THE **START** BUTTON OR **BLACK** BUTTON AFTER SELECTING ANY OF THE FIVE (5) ICONS UNLESS THIS IS WHAT IS DESIRED. **THE INFORMATION ASSOCIATED WITH THE RESET ICON WILL BE LOST!** PLEASE READ THE PREVIOUS PAGE FOR EXACTLY WHAT WILL HAPPEN IF ANY OF THESE FIVE (5) ICONS ARE **SELECTED & ACTIVATED**.



Before performing any **RESET**, write down your **last Audit Totals** (see Section 3, Chapter 3, **GO TO AUDITS MENU**) and any **personalized Adjustment changes** you may have made (see Section 3, Chapter 4, **GO TO ADJUSTMENTS MENU**).

REQUEST INSTALLED

If the "FACT" *Icon* is select and *activated*, "REQUEST INSTALLED" is indicated and the **Service Menu** is exited, returning to the **Attract Mode**. See the previous page for explanation & usage of the *Icons* in the **RESET MENU**.





Go To Tournament Menu

Overview

The **Portals™ Service Menu System** provides **6 Steps** necessary to **SET-UP, START, MONITOR** and **END** Pinball Tournaments on your *Tournament Pinball System Ready Pinball Game*. **OPTIONAL EQUIPMENT & HARDWARE (SOLD SEPARATELY) ARE REQUIRED FOR PROPER OPERATION AND USE OF THIS MENU.**

Game code may get upgraded during production; compare all Tournament Adjustments & Audits in the display with the manual and make any corrections to the Tournament Adjustments and/or Audits Tables (*next page*), as necessary. Tournament Adjustments & Audits are subject to change (*with or without notice*). To view Tournament Adjustments & Audits in the display, enter the **Portals™ Service Menu System**. When any change is made and then the next / previous item is selected (*or the Sub-Menu is exited*), the display will momentarily flash **REQUEST INSTALLED**. For details on **Earnings, Standard & Feature Audits**, see Section 3, Chapter 3, **GO TO AUDITS MENU**. For details on **Standard & Feature Adjustments**, see Section 3, Chapter 4, **GO TO ADJUSTMENTS MENU**.

For more details on the equipment & hardware required, Installation and Set-up, read the **ToPS™ Tournament Pinball System Kit Installation Manual** (SPI Part Number: 780-6011-00) provided in the **Optional Tournament Kit** (SPI Part Number: 500-5011-00), not included with this *ToPS™ Ready Pinball Game*.

The equipment & hardware consists of: **BETAbrite™ Electronic 7 X 80 Multi-Color Dot Display** (secured above the Backbox), **Tournament Serial Interface (TSI) Board** (secured in the Backbox), **Tournament Button + Lamp** (secured onto the Front Molding) and all necessary wiring, hardware and documentation (*which also provides suggestions and Tips for ToPS™*).

To order, contact your local Distributor (*view Pages DR. 8 & 9 in the Find-It-In-Front: Dr. Pinball*). You can also call Technical Support or visit our website (*details on the back cover of this manual*).



Important: The **Coin Door** must be **OPEN** allowing the **Memory Protect Switch** to be disabled, so any Tournament changes can be made.



EXPLANATION & USAGE OF COMMON LARGE & MINI-ICONS USED IN VARIOUS MENUS & SUB-MENUS:



These **non-selectable** icons appear in the selected Menu only when there are MORE icons to the LEFT or to the RIGHT available for selection.



Select and activate to return to the **PREVIOUS** Menu.



Select and activate to **QUIT**, exits & returns to the **Attract Mode**.



Select and activate to view **HELP** Screens of the current Menu*.



Select and activate to:
Move **LEFT** or **RIGHT**, select previous / next or move backwards / forwards.



DECREMENT (-) or **INCREMENT (+)** displayed value or select previous / next.

* **Help Note:** An explanation of each Mini-Icon at that menu level will cycle continuously. To exit a display where no Mini-Icons are available for selection, pressing any button will exit the display.



GO TO TOURNAMENT MENU (OPTIONAL USE ONLY)

After entering **Portals™**, the **MAIN MENU** now appears. Select the **"TOUR" Icon** in the **MAIN MENU** with either the Red **"LEFT"** or Green **"RIGHT"** Buttons (the **Flipper Buttons** operates in the same manner) and press the **Black "ENTER" Button** (the **Start Button** operates in the same manner). The **TOURNAMENT MENU** appears. Continue through this chapter for the explanation & usage of the *Icons* in the **TOURNAMENT MENU**.

Tournament Adjustment & Audit Tables on the next page.



TOURNAMENT ADJUSTMENT TABLES

TOURNAMENT ADJUSTMENTS 69-77

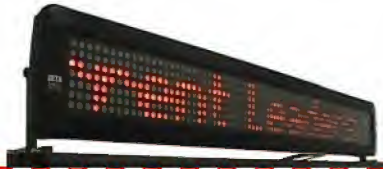
ADJUSTMENT NAME	ADJUSTMENT NAME	ADJUSTMENT NAME
USA DEFAULT	USA DEFAULT	USA DEFAULT
YOUR SETTING	YOUR SETTING	YOUR SETTING
CREDITS PER PLAY	JACKPOT MAX.	# OF PRIZES
69 02	72 \$2,500.00	75 03
JACKPOT BASE	START DATE	PRIZE TYPE
70 \$20.00	73 JANUARY 1	76 CASH
JACKPOT INCREMENT	END DATE	SHOW PLAYER'S CASH
71 \$00.50	74 FEBRUARY 1	77 YES

Note: The above adjustments must be set just before selecting and activating the "START" icon (START TOURNAMENT). See the following pages for explanation and more details.



SIGN MESSAGES A-B (ADJUSTMENTS 78-79)

ADJUSTMENT NAME	ADJUSTMENT NAME
USA DEFAULT	USA DEFAULT
YOUR SETTING	YOUR SETTING
LOCATION MESSAGE	PRIZE MESSAGE
78 ON	79 ON



STARTING METER Reading :	STARTING METER Date (MM/DD/YR) :	AUDITOR'S NAME :	CURRENT VOLUME SETTING:
CURRENT METER Reading :	AUDIT Date (MM/DD/YR) :	CPU Version :	DISPLAY Version :

GAME LOCATION NAME :

See Adj. 78 & 79 above >>

TOURNAMENT START DATE :	TOURNAMENT END DATE :

TOURNAMENT AUDIT TABLE



TOURNAMENT AUDITS 173-184

Audit definitions follow in this Chapter.

TOTAL PLAYS	TOTAL TOUR. EARNINGS	ACCUM. TOTAL PLAYS	ACCUM. TOUR EARNINGS
173:	176:	179:	182:
TOURNAMENT PLAYS	JACKPOT	ACCUM. TOUR. PLAYS	ACCUM. JACKPOT
174:	177:	180:	183:
TOTAL GAME EARNINGS	NET EARNINGS	ACCUM. EARNINGS	# TOURNAMENTS
175:	178:	181:	184:





Tournament Adjustments (01-10)

To initiate, from the **TOURNAMENT MENU**, select the "SET UP" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Tournament Adjustment in this group. Select and *activate* either of the "-" or "+" *Mini-Icons* to change the setting, if desired (*the Default Setting is noted in the definitions below*). The display will describe the **Tournament Adjustment Number**, **Tournament Adjustment Name** and the **Current Tournament Adjustment Setting**. The current Tournament Adjustment will remain in the display until the next Tournament Adjustment is viewed or when this Menu is exited.

IMPORTANT FOR TOURNAMENT USERS: *Select the settings carefully. For Tips for ToPS™ (different Tournament Sample Set-Ups, etc.), view the ToPS™ Tournament Pinball System Kit Installation Manual (SPI Part Number: 780-6011-00) provided in the Optional Tournament Kit (SPI Part Number: 502-5011-00). Before allowing players to begin after you've started a Tournament, double-check the Normal Mono-Color Dot Display and Top Multi-Color Dot (Beta Brite®) Display to ensure everything you want is displayed correctly. Once a Tournament is started, no adjustments can be made until you end the Tournament (by selecting the "END" Icon). Allowing players to qualify, then ending a Tournament prematurely to make corrections will affect the outcome of the Tournament. View the ToPS™ Manual for more details.*

WARNING: Changes made in any Adjustments will be lost after a FACTORY RESET or removal of the CPU/Sound Board Batteries.

Nr.	TOURNAMENT ADJUSTMENT NAME: Definition
01	CREDITS PER PLAY: Set between 01 - 10 . Default is 02 . Set the maximum number of <i>Credits</i> that may be accumulated per game.
02	JACKPOT BASE: Set between \$00.00 - \$999,999.00 (<i>increments of \$1</i>). Default is \$20.00 . Set the initial <i>Prize Pool Amount</i> to be offered for the Tournament. Note: <i>The displays will present the words "PRIZE POOL" in lieu of the word "JACKPOT".</i>
03	JACKPOT INCREMENT: Set between \$00.00 - \$999,999.99 (<i>increments of 1¢</i>). Default is \$00.50 . Set the <i>Prize Pool Increment</i> which will increase the <i>Prize Pool Amount</i> with each Tournament Game played.
04	JACKPOT MAX.: Set between \$00.00 - \$999,999.00 (<i>increments of \$1</i>). Default is \$2,500.00 . Set the maximum cap to be placed on the <i>Prize Pool</i> during a Tournament. Note: <i>The displays will present the words "PRIZE POOL" in lieu of "JACKPOT".</i>
05	CURRENT DATE/TIME: Set the current date and time. After setting the Start and End Dates in Tournament Adjustments 6 & 7, the Tournament will then start automatically*. <i>*Requires the TIMEKEEPER™ IC (included in this kit) installed in Location U212 on the CPU/Sound Board.</i>
06	START DATE: Set between JANUARY through DECEMBER . Default is JANUARY . After the month desired is set, a valid day must be set. To Start a Tournament , go back to the TOURNAMENT MENU and select the "STRT" <i>Icon</i> (see the next page).
07	END DATE: Set between JANUARY through DECEMBER . Default is FEBRUARY . After the month desired is set, a valid day must be set. To End a Tournament , go back to the TOURNAMENT MENU and select the "END" <i>Icon</i> (see the next page).
08	# OF PRIZES: Set between 01 - 05 . Default is 03 . Set the maximum number of <i>Prize Positions</i> to be awarded during a Tournament. Selections (<i>cannot be changed</i>) are as follows: Set to 01 , the Tournament Winner is awarded 100% of the <i>Prize Pool</i> . Set to 02 , the 1st & 2nd place winners are awarded 70% / 30% , respectively. Set to 03 , the 1st, 2nd & 3rd place winners are awarded 50% / 30% / 20% , respectively. Set to 04 , the 1st, 2nd, 3rd & 4th place winners are awarded 50% / 25% / 15% / 10% , respectively. Set to 05 , the 1st, 2nd, 3rd, 4th & 5th place winners are awarded 50% / 20% / 15% / 10% / 5% , respectively.
	PRIZE TYPE: Set to CASH , POINTS , TICKETS or OTHER . Default is CASH . <i>This adjustment determines how the Prize Pool is to be represented in the Attract Mode on both the Normal and top Beta-Brite® Displays.</i>
09	Select CASH for the displays to represent the <i>Prize Pool amount (based on Jackpot Base and Max.) in \$Dollars. Select POINTS for the displays to represent the <i>Prize Pool amount in Points</i>. Select TICKETS for the display to represent the <i>Prize Pool amount in Tickets</i>. Select OTHER NOT TO represent the <i>Prize Pool amount (if prize(s) to be awarded are not Cash, Points or Tickets)</i>.</i>
10	SHOW PLAYER'S CASH: Set to YES or NO . Default is YES . When set to YES , both the Beta- Brite® Multi-Color Dot Display and the Normal Mono-Color Display exhibit the <i>Cash amount in the Attract Mode</i> .





Tournament Adjustments (69-77)

To initiate, from the **TOURNAMENT MENU**, select the "SET UP" *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Buttons** and press the **Black "ENTER" Button**. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Tournament Adjustment in this group. Select and *activate* either of the "-" or "+" *Mini-Icons* to change the setting, if desired (*the Default Setting is noted in the definitions below*). The display will describe the **Tournament Adjustment Number**, **Tournament Adjustment Name** and the **Current Tournament Adjustment Setting**. The current Tournament Adjustment will remain in the display until the next Tournament Adjustment is viewed or when this Menu is exited.

IMPORTANT FOR TOURNAMENT USERS: *Select the settings carefully. For Tips for ToPS™ (different Tournament Sample Set-Ups, etc.), view the ToPS™ Tournament Pinball System Kit Installation Manual (SPI Part Number: 780-6011-00) provided in the Optional Tournament Kit (SPI Part Number: 500-5011-00). Before allowing players to begin after you've started a Tournament, double-check the Normal Mono-Color Dot Display and Top Multi-Color Dot (Beta Brite®) Display to ensure everything you want is displayed correctly. Once a Tournament is started, no adjustments can be made until you end the Tournament (by selecting the "END" Icon). Allowing players to qualify, then ending a Tournament prematurely to make corrections will affect the outcome of the Tournament. View the ToPS™ Manual for more details.*

Adj. N ^o	Tournament Adjustment Name	Tournament Adjustment Definition
 69	CREDITS PER PLAY	Set between 01 - 10 . Default is 02 . Set the maximum number of <i>Credits</i> that may be accumulated per game.
70	JACKPOT BASE	Set between \$00.00 - \$999,99.00 (<i>increments of \$1</i>). Default is \$20.00 . Set the initial <i>Prize Pool Amount</i> to be offered for the Tournament. Note: <i>The displays will present the words "PRIZE POOL" in lieu of the word "JACKPOT".</i>
71	JACKPOT INCREMENT	Set between \$00.00 - \$999,99.99 (<i>increments of 1¢</i>). Default is \$00.50 . Set the <i>Prize Pool Increment</i> which will increase the <i>Prize Pool Amount</i> with each Tournament Game played.
72	JACKPOT MAX.	Set between \$00.00 - \$999,99.00 (<i>increments of \$1</i>). Default is \$2,500.00 . Set the maximum cap to be placed on the <i>Prize Pool</i> during a Tournament. Note: <i>The displays will present the words "PRIZE POOL" in lieu of "JACKPOT".</i>
73	START DATE	Set between JANUARY through DECEMBER . Default is JANUARY . After the month desired is set, a valid day must be set. To Start a Tournament , go back to the TOURNAMENT MENU and select the "STRT" <i>Icon</i> (<i>see the next page</i>).
74	END DATE	Set to JANUARY through DECEMBER . Default is FEBRUARY . After the month desired is set a valid day must be set. To end a Tournament , go back to the TOURNAMENT MENU and select the "END" <i>Icon</i> (<i>see the next page</i>).
75	# OF PRIZES	Set between 01 - 05 . Default is 03 . Set the maximum number of <i>Prize Positions</i> to be awarded during a Tournament. Selections (<i>cannot be changed</i>) are as follows: Set to 01 , the Tournament Winner is awarded 100% of the <i>Prize Pool</i> . Set to 02 , the 1st & 2nd place winners are awarded 70% / 30% , respectively. Set to 03 , the 1st, 2nd & 3rd place winners are awarded 50% / 30% / 20% , respectively. Set to 04 , the 1st, 2nd, 3rd & 4th place winners are awarded 50% / 25% / 15% / 10% , respectively. Set to 05 , the 1st, 2nd, 3rd, 4th & 5th place winners are awarded 50% / 20% / 15% / 10% / 5% , respectively.
		Set to CASH , POINTS , TICKETS or OTHER . Default is CASH .
76	PRIZE TYPE	<i>This adjustment determines how the Prize Pool is to be represented in the Attract Mode on both the Normal and top Beta-Brite® Displays.</i> Select CASH for the displays to represent the <i>Prize Pool amount</i> (<i>based on Jackpot Base and Max.</i>) in \$Dollars . Select POINTS for the displays to represent the <i>Prize Pool amount</i> in Points . Select TICKETS for the display to represent the <i>Prize Pool amount</i> in Tickets . Select OTHER NOT TO represent the <i>Prize Pool amount</i> (<i>if prize(s) to be awarded are not Cash, Points or Tickets</i>).
77	SHOW PLAYER'S CASH	Set to YES or NO . Default is YES . When set to YES , both the Beta-Brite® Multi-Color Dot Display and the Normal Mono-Color Display exhibit the <i>Cash amount</i> in the Attract Mode .



Start Tournament (select only after Set-Up is completed)

To initiate, from the **TOURNAMENT MENU**, select the "STRT" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. The "START TOURNAMENT?" MENU appears with the "NO" *Mini-Icon* flashing.

If **Set-Up (Tournament Adjustments)** was not completed **OR** the **Tournament Audits were not recorded from the prior Tournament**, exit this Menu by activating the "NO" *Mini-Icon*. If **Set-Up** was completed and the **Tournament Audits** were recorded, select and activate the "YES" *Mini-Icon*.

The Pinball Game is set to **Tournament Ready Mode** (the **Flashing Tournament Button** must be depressed for a **Tournament Game** after the proper credit is inserted).

"REQUEST INSTALLED" is indicated and returns to the **TOURNAMENT MENU** with the "STRT" *Icon* flashing. **Note:** If the "STRT" *Icon* appears to be non-functioning, it is because a **Tournament** is in progress. The **Tournament** must first be stopped (select and activate the "END" *Icon* in the **TOURNAMENT MENU**).

START TOURNAMENT?

NO YES QUIT ?



Stop Tournament (select only after a Tournament is started)

To initiate, from the **TOURNAMENT MENU**, select the "END" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. The "END TOURNAMENT?" MENU appears with the "NO" *Mini-Icon* flashing. If the

Tournament was not completed, exit this Menu by activating the "NO" *Mini-Icon*. If the **Tournament** was completed (the **End Date** set has passed), select and activate the "YES" *Mini-Icon*. The Pinball Game is taken out of **Tournament Ready Mode** (to readjust any **Tournament Adjustments**, the **Tournament** must be "stopped"). "REQUEST INSTALLED" is indicated and returns to the **TOURNAMENT MENU** with the "END" *Icon* flashing.

Record your Tournament Audits at this time as they will be reset (except for the "Accumulative Audits") if another Tournament is started!

END TOURNAMENT?

NO YES QUIT ?

Sec. 3: Tournament ...



Tournament Prizes

To initiate, from the **TOURNAMENT MENU**, select the "PRIZ" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Leader in this group. The display will describe the **Leader**

Placement (1st, 2nd, 3rd, 4th & 5th), Leader Name, 4-Digit Pin-Code, and Prize Pool portion for the **Current and Previous Tournaments**. The current Leader (and related information) will remain in the display until the next Leader is chosen or when the Sub-Menu is exited.



Tournament Audits (173-184)

To initiate, from the **TOURNAMENT MENU**, select the "AUD" *Icon* with either the Red "LEFT" or Green "RIGHT" Buttons and press the Black "ENTER" Button. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous **Tournament Audit** in this group. The display will describe the **Tournament Audit Number, Tournament Audit Name** and the **Current Tournament Audit Total** (Value). The current

Tournament Audit will remain in the display until the next **Tournament Audit** is viewed or when this Menu is exited.

IMPORTANT FOR TOURNAMENT USERS: >>>> **A L L** of the **Tournament Audits 140-151 are RESET O N L Y** if a **Factory Reset is done** (see **Section 3, Chapter 6, GO TO RESET MENU**). >>>> **Tournament Audits 140-145 are RESET ONLY if a new Tournament is started**. >>>> **Tournament Audits 146-151 are NOT RESET***, they're **accumulative** (totals accumulate since the first **Tournament** was played). ***if no Factory Reset is done.**

Aud. N ^o	Tournament Audit Name	Tournament Audit Definition
173	TOTAL PLAYS	Provides the total number of <i>Regular</i> and <i>Tournament Games</i> played while a <i>Tournament</i> is active (in progress). This total is derived by adding Tournament Audit 174, TOURNAMENT PLAYS , with <i>Regular Plays</i> .
174	TOURNAMENT PLAYS	Provides the total number of <i>Tournament Games</i> played while a <i>Tournament</i> is active (in progress).
175	TOTAL GAME EARNINGS	Provides the total Gross Earnings accepted, while a <i>Tournament</i> is active (in progress).
176	TOTAL TOUR. EARNINGS	Provides the total Tournament Earnings (Audit 175 less <i>Regular Game Earnings</i>) while a <i>Tournament</i> is active (in progress).

Tournament Audits 177-184 continued on the next page.





Tournament Audits Continued.

	Tournament Audit Name	Tournament Audit Definition
177	JACKPOT (PRIZE POOL TOTAL)	Provides the total Prize Pool (<i>Jackpot</i>) Amount to be paid out while a <i>Tournament is active (in progress)</i> .
178	NET EARNINGS	Provides the total Net Earnings (<i>Gross Earnings less Prize Pool</i>) while a <i>Tournament is active (in progress)</i> .
The following Tournament Audits WILL NOT BE RESET if a new Tournament is started. ALL AUDITS can be reset if a Factory Reset is done!		
179	ACCUM. TOTAL PLAYS	Provides the accumulative total amount of <i>Regular & Tournament Games</i> played since the first Tournament was played.
180	ACCUM. TOUR. PLAYS	Provides the accumulative total amount of <i>Tournament Games</i> played since the first Tournament was played.
181	ACCUM. EARNINGS	Provides the total Gross Earnings <i>accepted</i> , since the first Tournament was played.
182	ACCUM. TOUR EARNINGS	Provides the accumulative total Tournament Game Earnings since the first Tournament was played.
183	ACCUM. JACKPOT	Provides the accumulative total of Prize Pool (<i>Jackpot</i>) Amounts paid out since the first Tournament was played.
184	# TOURNAMENTS	Provides the number of Tournaments (<i>not individual Tournament Games</i>) since the first Tournament was played.



Sign Messages A-B (Tournie Adj. 78-79)

To initiate, from the **TOURNAMENT MENU**, select the "A-B TEXT" *Icon* with either the **Red "LEFT"** or **Green "RIGHT"** Buttons and press the **Black "ENTER"** Button. Select and *activate* either of the ">>" *Mini-Icons* to view the next or previous Tournament Adjustment in this group. Select and *activate* either of the "-" or "+" *Mini-Icons* to change the setting, if desired (*the Default Setting is noted in the definitions below*). The display will describe the **Tournament Adjustment Number**, **Tournament Adjustment Name** and the **Current Tournament Adjustment Setting**. The current Tournament Adjustment will remain in the display until the next Tournament Adjustment is viewed or when this Menu is exited.

Adj. N ^o	Tournament Adjustment Name	Tournament Adjustment Definition
78	LOCATION MESSAGE	Set to ON , CHANGE or OFF . Default is ON . When set to CHANGE , a new message can be set or the old one can be edited (<i>select the "+" Mini-Icon to change settings until "CHANGE" appears in the display, then select the ">>" Mini-Icon to access.</i>). At the top left corner of the Display, the letter A is indicated (<i>blinking</i>) in the first available position. Vary the letter(s) by operating the Left and Right Flipper Buttons (or "RED" or "GREEN" Buttons). With the desired letter indicated, depress the Start Button to lock in the letter and advance to the next character. Repeat this procedure until the desired message is completed in the display. Select the "<" or ">" characters to back-space (<i>erase</i>) and/or to move forward in an already typed message. After completion, press the "BLACK" Button, "REQUEST INSTALLED" is indicated and then exits this sub-menu.
79	PRIZE MESSAGE	

The **DEFAULT LOCATION MESSAGE** is:

STERN PINBALL PROUDLY PRESENTS...

The **DEFAULT PRIZE MESSAGE** is:

YOU CAN BE THE NEXT BIG WINNER!



IMPORTANT FOR TOURNAMENT USERS:

2 additional messages can be added by using the **Beta Brite® Remote**. More details in the **ToPS™ Tournament Pinball System Kit Installation Manual** (SPI Part Number: 780-6011-00) provided in the **Optional Tournament Kit** (SPI Part Number: 500-5011-00).



Sec. 4: Parts Id. ...



Parts Identification & Location (The Pink Pages)

Overview

This section provides the Part N's and locations of all the components in this pinball machine. The parts are arranged in three groups: **BACKBOX**, **CABINET** & **PLAYFIELD**. Generic parts which may change as production continues (quantity and/or size) are listed together. Quantities greater than 0 indicates that the part is used in this game. Since quantity changes *may occur*, an item indicating "0" may be used. Compare the item which needs to be replaced with the drawings provided (the *Posts, Sockets, Bulbs & Rubber Rings* are drawn actual size). Major Assemblies & Ramps are detailed in the Blue Pages, Chapter 2. **Important:** Read all "Take Note:" items.

Section 4, Table of Contents

Chapter 1 (The Pink Pages)

Overview

.....55

BACKBOX:

PLAYBOY Backbox Assy.

.....56

Speaker Panel Assy. for the
Backbox and Assoc. Parts:... 57

CABINET:

General Parts & Switches

..... 58-59

PLAYFIELD:

General Parts & Switches

(Below)..... 60

General Parts & Switches

(Above) 61

Rubber Parts

.....62

Plastics (Screened & Clear),
Translites & Decals 63

Rails, Wire Forms & Ball Guides
and Misc. Ramp64

Metal Posts (Screws)
and Nuts65

Metal Spacers

.....66

Plastic Posts and Spacers

..... 67

Small Bayonet Type Bulbs

and Sockets 68

Large Bayonet Type Bulb

and Sockets 69

Wedge Base Bulbs

and Sockets..... 70

Chapter 2 (The Blue Pages)

Overview

.....71

Drawings for Major Assemblies
& Ramps72-94

Sec. 4: Parts Id. ...



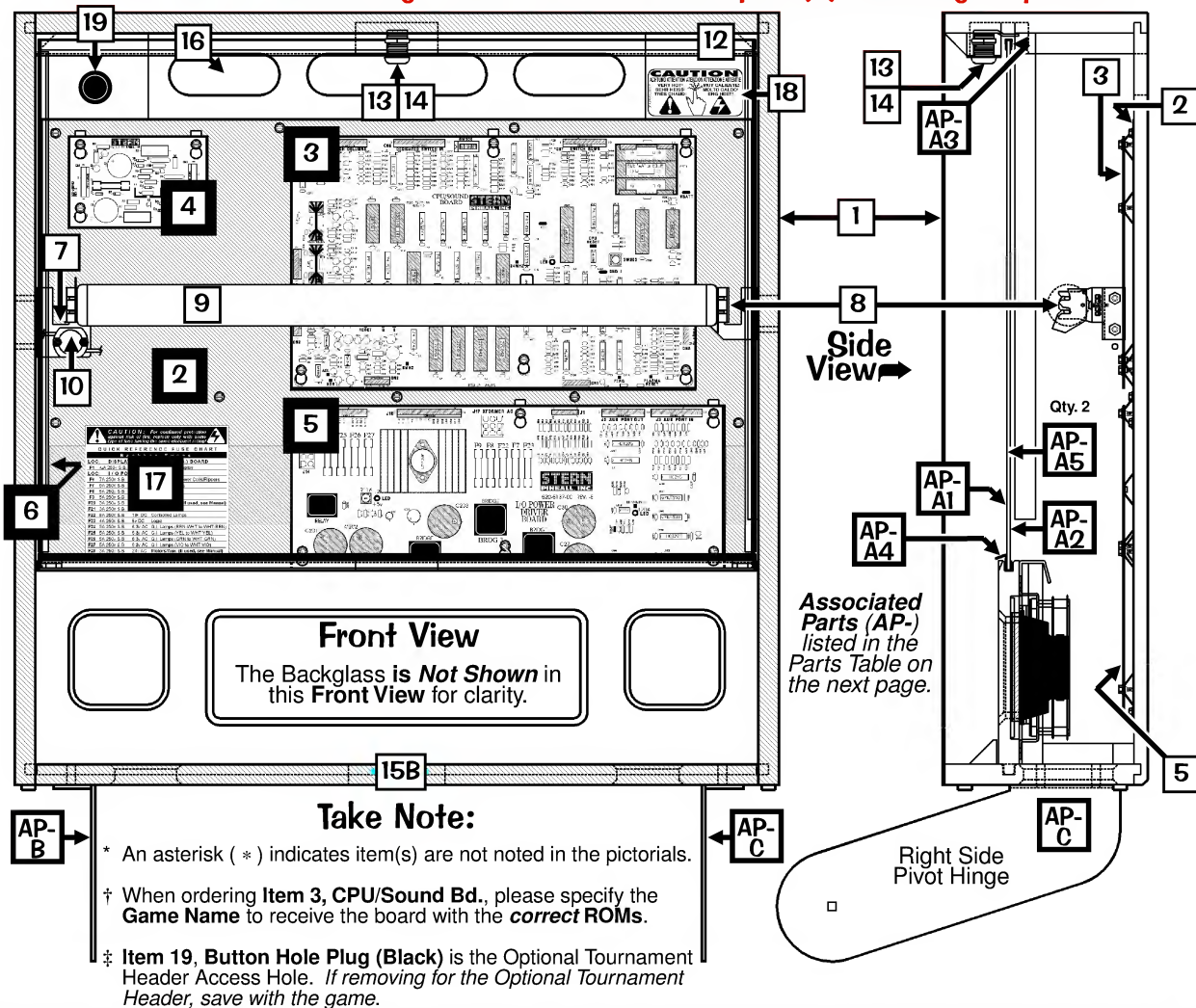
Backbox

Speaker Panel & Display

Playfield

Cabinet

PLAYBOY Backbox Assembly, 505-6002-76-76 (Items 1-27)
Not sold as an assembly, order the individual part(s) actually required.

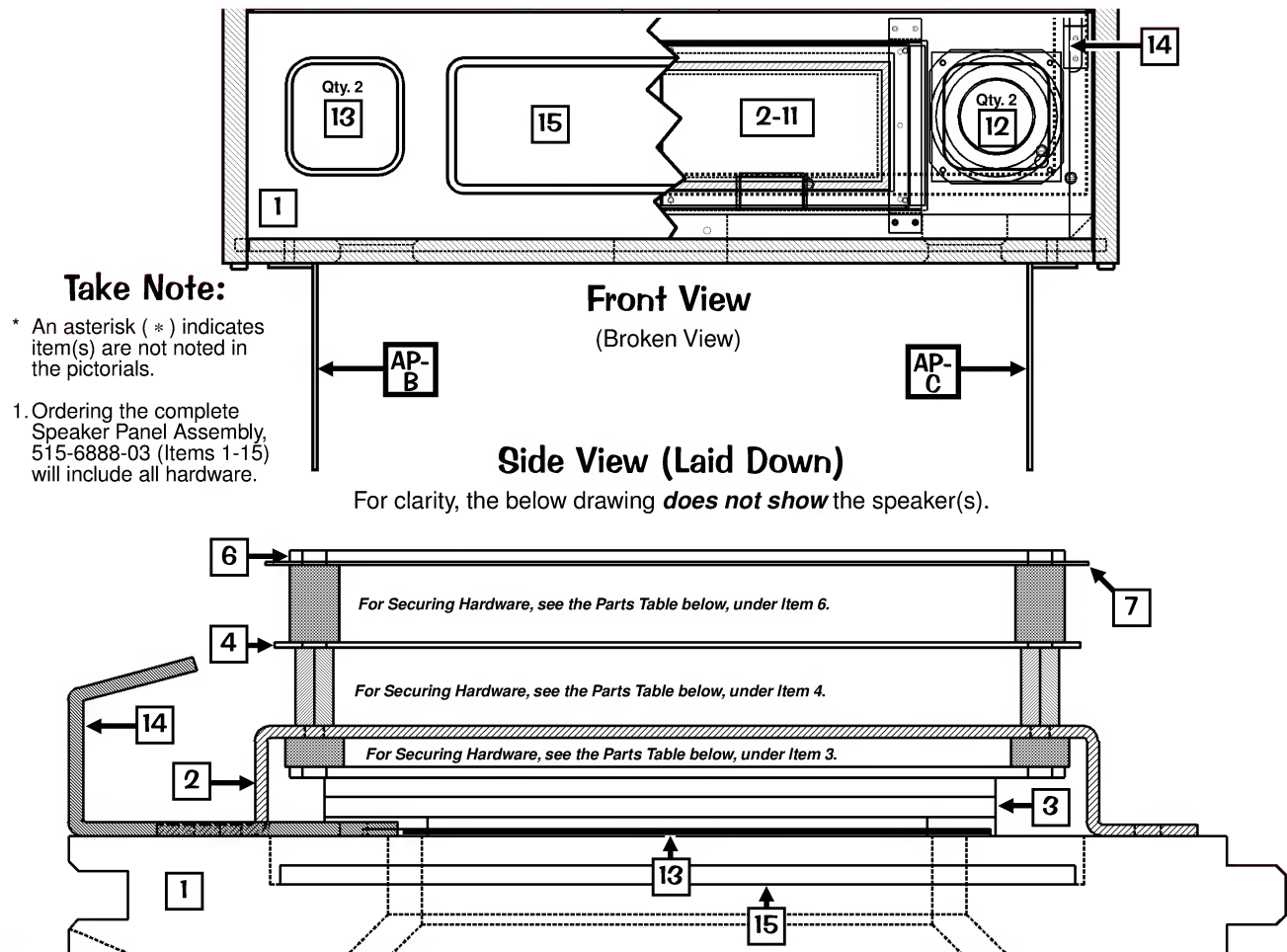


Sec. 4: Parts Id. ...

Nº	BACKBOX PART NAME	QTY.	SPI PART Nº	Nº	BACKBOX PART NAME	QTY.	SPI PART Nº
1	Backbox (PLAYBOY)	1	525-5558-76	10*	Ground Strap (5") (by Item 12)	1	600-5006-05
Item 1 Note: Black Textured T-Molding is installed and cannot be ordered separately.				11	Starter - Fluorescent (FS2 Light)	1	165-5011-01
2	PCB Metal Mounting Plate	1	535-5809-04	12	Ballast CU45Z-W 1/2" Core 120v 50/60 Hz 13W	1	010-5015-00
Item 2 is secured to Item 1 by: #8 X 1/2" HWH AB (Zinc) (Qty. 13) (234-5101-00) and #10 Washer 7/32" I.D. X .5" O.D. X 1/16" Thick (Qty. 4) (242-5003-00)				14	Ballast Mounting Plate	1	535-8657-00
3 †	CPU/Sound Board (Mono) FCC-FEB98	1	520-5136-16	Item 12 is secured to Item 1 by: #6 X 5/8" HWH AB (Zinc) (Qty. 2) (234-5102-04)			
4	Display Power Supply Board	1	520-5138-00	13	Lock Mounting Plate (2001)	1	535-8128-01
5	I/O Power Driver Board	1	520-5137-01	14	Camlock/Key (N23078A•CAM•2K•SF2400)	1	355-5018-02
Items 3, 4 & 5 are secured to Item 2 by: #8-32 X 3/8" HWH MS (Qty. 19) (237-5937-00)				Items 13-14 are secured by: #8 X 5/8" TP Torx T20 (Qty. 4) (237-5947-00)			
6	Solenoid Expander Board (UK Only)	1	520-5192-00	15A	#1 Roto Lock Male (on Cabinet)	1	355-5006-01
Item 6 is required for UK Games Only to support the Left & Right Outlane Ball Deflectors & Center Up/Down Post Assemblies not supported in the Normal Coil Matrix of Q1-Q32.				15B	#1 Roto Lock Female (R2-0002-02)	1	355-5006-02
7	Fluorescent Light Bracket Assy. Left	1	515-6545-00	Item 15B is secured by: #10-24 X 1-3/4" CBSN (Qty. 2) (231-5022-00), #10-24 Keps Nut (Qty. 2) (240-5207-00) and #10 Washer 7/32" ID X .5" OD X 1/16" (Qty. 2) (242-5003-00)			
ORDERING ABOVE (ITEM 7) SUB-ASSY. PART Nº WILL INCLUDE:				16	Back Vent Grill 2-1/2" X 18"	1	545-5072-02
7A	Fluorescent Light Bracket Left	1	535-7739-00	Item 16 is secured by: Staple 5/16" (Qty. 24) (631-5000-00)			
7B	Lamp Holder (Self-Locking)	1	077-5214-00	17	Fuse Description Decal (Generic)	1	820-6152-01
7C	#6-32 X 5/8" PPH MS (Sems) Zinc	1	232-5203-00	18	"CAUTION - VERY HOT" Decal	1	820-6266-00
7D	Starter Base (with Leads)	1	077-5213-00	19‡	Button Hole Plug (Blk) (Happ #52-6214-00)	1	500-6566-00
7E	#4-40 X 1/2" PPH MS (Sems) Zinc	2	237-5813-00	20*	Fuse Label (UL)	1	820-6143-00
Ordering Note: If 515-6545-00 is unavailable, order the individual part(s) actually required.				21*	Backbox Date Label	1	820-5091-00
8	Fluorescent Light Bracket Assy. Right	1	515-6545-01	22*	Ribbon Cable, 20-Pin (4")	1	036-5000-04
ORDERING ABOVE (ITEM 8) SUB-ASSY. PART Nº WILL INCLUDE:				23*	Ribbon Cable, 26-Pin (40")	1	036-5001-40
8A	Fluorescent Light Bracket Right	1	535-7739-01	24*	1/4" Clamp (Double)	3	040-5000-23
8B-8C	Identical to Items 7B-7C above.	See 7B-7C		25*	1/2" Clamp (Single)	1	040-5000-06
Items 7 & 8 are secured by: #10-24 X 1-1/4" Carriage Bolt Sq. Neck (Qty. 2/per) (231-5012-00), #10-24 Keps Nut (Qty. 2/per) (240-5207-00) and 3/4" X 3" Reinforced Strapping Tape (Qty. 1, Sold in 12" Lengths only) (626-5040-00)				26*	3/4" Clamp (Single)	2	040-5000-08
Ordering Note: If 515-6545-01 is unavailable, order the individual part(s) actually required.				27*	1" Clamp (Single)	6	040-5000-09
9	Fluorescent Tube 24" (F18T8CW)	1	165-5061-00	Items 24-27 are secured to Item 1 by: #8 X 1/2" HWH AB (Zinc) (Qty. 13) (234-5101-00)			



PLAYBOY Speaker Panel Assy. for the Backbox, 515-6888-03 (Items 1-15) and Assoc. Parts: Backglass Assembly & Pivot Hinges (Left & Right) (Items AP-A - AP-C) Not sold as an assembly, order the individual part(s) actually required.



Nº	SPEAKER PANEL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Speaker Panel (Black Wood)	1	525-5515-00	15	Plastic Shield (Display Cover)	1	545-5884-00
2	Dot Matrix Disp. Bd. Mounting Bracket	2	535-8368-01	Item 15 is secured to Item 2 by: #6 X 3/8" HWH AB (Zinc) (Qty. 8) (234-5000-00)			
Item 2 is secured to Item 1 by: #8 X 3/4" HWH AB (Zinc) (Qty. 4/per) (234-5103-00)				The Associated Parts AP-A thru AP-C are also noted in the Backbox Assembly drawings on the previous page.			
3	Dot Matrix Display Board 128 X 32	1	520-5052-00	ASSOC. PARTS ARE NOT INCLUDED WITH BACKBOX/SPKR. PANEL ASSY'S.			
Item 3 is secured to Item 2 by (at corners): 3/16" X 3/8" Spacer Gray (Qty. 4) (254-5000-18) and #6-32 X 1/2" HWH Swage (Serr) Zinc (Qty. 4) (237-5976-03)				Nº	ASSOC. BACKBOX PART NAME	QTY.	SPI PART Nº
Item 3 is secured to Item 4 (at the top center) by: 3/4" X 1/4" Hex Spacer #6-32 Tap (Qty. 1) (254-5008-04) and #6-32 X 1/4" PPH MS (Sems) Zinc (Qty. 1) (232-5200-00)				AP-A	Backglass Assembly (Game Nº 76)	1	See Parts Below
4	Static Shield (Steel Plate)	1	535-6437-00	ORDER ONLY INDIVIDUAL PART(S) NEEDED:			
Item 4 is secured to Item 2 by: 1/2" X 1/4" Hex Spacer #6-32 Tap (Qty. 4) (254-5008-03) and #6-32 X 1/2" PPH MS (Sems) Zinc (Qty. 2, on Left Side only) (232-5202-00)				AP-A1	Clear Backglass 25.906" X 19.187"	1	660-5038-02
5*	Edge Protector (on Item 4)	2	545-5592-01	AP-A2	Playboy Film Art w/Hologram (#76)	1	515-7252-76
6	Display Controller Board FCC-FEB98	1	520-5055-03	NOTE: The Playboy Backglass Film Art must have the Official Playboy Hologram Logo affixed. It cannot be displayed without it!			
Item 6 is secured to Item 4 by: 1/2" X 5/16" X .144 ID Spacer Tap (Qty. 3) (254-5014-00), #6-32 X 3/4" PPH MS (Sems) Zinc (Qty. 3) (237-5504-00), 1/2" X 1/4" Hex Spacer #6-32 Tap (Qty. 1) (254-5008-03) and #6-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5200-00)				AP-A3	Top Plastic Channel - 26"	1	545-5018-15
7	RF Shield	1	820-5092-00	AP-A4	Bottom Plastic Lift Channel - 26-1/16"	1	545-5021-01
Item 7 is secured inbetween: "Item 6" and its' mounting hardware described.				AP-A5	Plastic Edging (Left/Right) - 18-1/8"	2	545-5018-14
8*	Ground Strap (25") (on Items 4, 6, 12)	4	600-5006-25	AP-A6*	Tape (double-sided) (12" Length)	1	626-5005-00
9*	1/2" Clamp (Single) (on Item 4)	1	040-5000-06	Note: AP-A6 secures AP-A3--A5 to AP-A1 (only 6" required)			
10*	Ribbon Cable, 14-Pin	1	036-5260-00	AP-B	Pivot Hinge Left	1	535-7999-00
Item 10 Note: The 14-Pin cable connects the Dot Matrix Disp. Bd. to the Disp. Controller Bd.				AP-C	Pivot Hinge Right	1	535-7999-01
11*	Foam 3/16" Thk. X 1/4" X 36"	6	626-5026-00	Items AP-B & AP-C are secured to Backbox by: 1/4"-20 X 1-1/4" C.B. Sq. Neck (Qty. 4) (231-5003-00), 1/4"-20 Flange Nut (Qty. 4) (240-5300-00) and Fend Washer 1/4" I.D. X 1" O.D. (Qty. 1) (242-5009-00)			
Above Item 11 is self-adhesive. Located between Items 3 & 17. Sold in 12" Lengths only.				Items AP-B & AP-C are secured to Cabinet by: 1/4"-20 X 7/8" Carriage Bolt Sq. Neck (Qty. 2) (231-5014-00), Hinge Spacer (Qty. 2) (530-5099-00), Washer 1/4" I.D. X 7/8" O.D. X 1/8" Yellow (Qty. 1/per) (242-5016-01), Fend Washer 1/4" I.D. X 1" O.D. (Qty. 1/per) (242-5009-00) and 1/4"-20 Flange Nut (Qty. 1/per) (240-5300-00)			
12	Speaker (Shld.) 4" 8Ω MG Elec #4060SH	2	031-5004-01	Note: Inside cabinet holes are covered by BLACK MYLAR COVER DISCS (QTY. 2) (820-5041-00) to hide securing hardware (AP-B & AP-C above) from player view.			
13	Speaker Grill (Black w/no Artwork)	2	535-8081-01				
14	Speaker Panel Hook Bracket	2	535-7009-02				
Items 12, 13 & 14 are secured by: #8 X 3/4" HWH AB (Zinc) (Items 12/13: Qty. 4/per; Item 14: Qty. 2/per) (234-5103-00)							

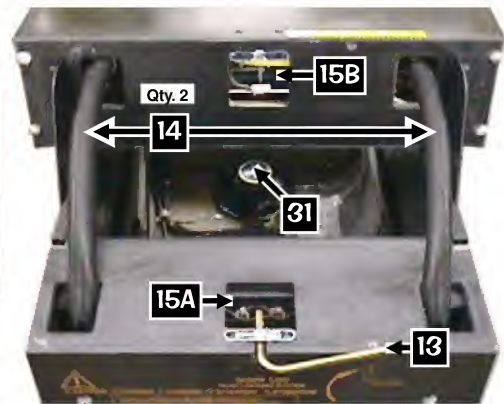
Cabinet - General Parts ■ & Switches □

For Backbox Parts see the previous two pages.

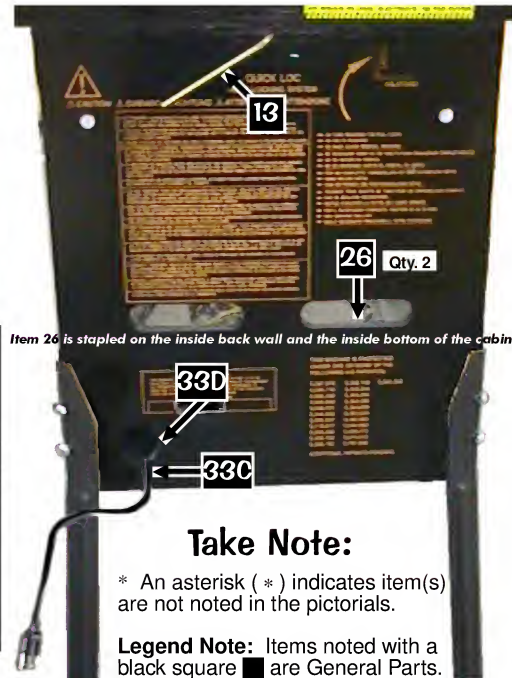


Take Note:

‡ Item 11, Button Hole Plug (Blk) is the Optional Tournie Button Access Hole. If removing for the Optional Tournament Button, save with the game.



View of the back of the Cabinet with the Backbox in the down position.



Item 26 is stapled on the inside back wall and the inside bottom of the cabinet.

Take Note:

* An asterisk (*) indicates item(s) are not noted in the pictorials.

Legend Note: Items noted with a black square ■ are General Parts. Items noted with a white square □ are Switches.

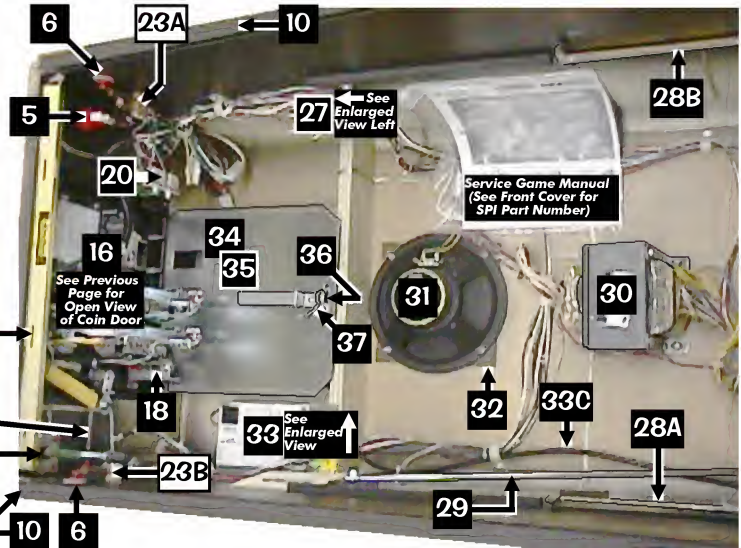
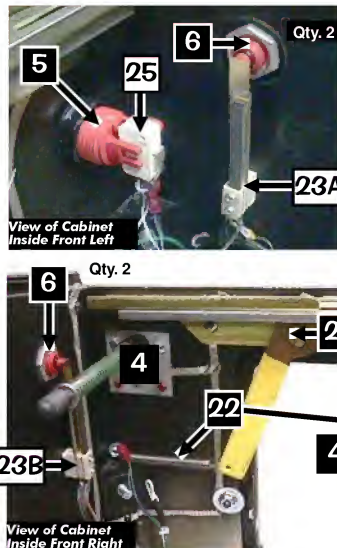
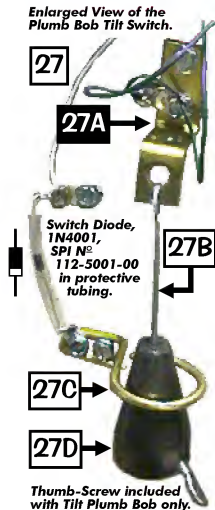
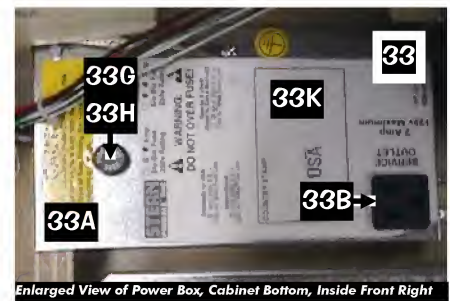
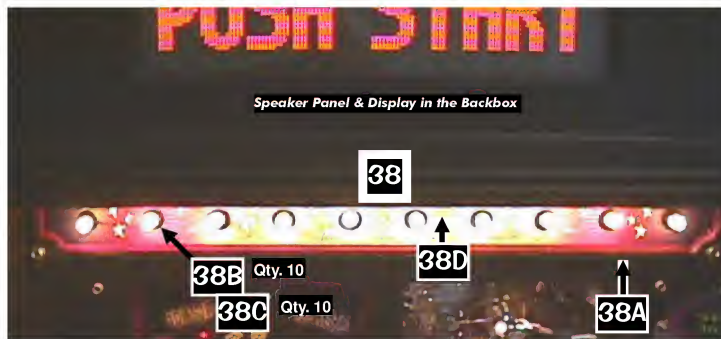
Sec. 4: Parts Id. ...

Nº	CABINET PART NAME	QTY.	SPI PART Nº
1	Game Nº 76 Screened Cabinet (Plain)	1	525-6000-76
2	Black Leg & Leveler Assembly	4	500-5921-50
Item 2 is secured by: Leg Bolt Back Plate (535-5703-00) and Leg Bolt 3/8" X 16 X 2-1/2" Hex 5/8" Hd. (2/per) (231-5001-01) To order just a Leg Leveler (3/8" - 16 X 3") use SPI Nº: 500-5017-00. A Leg "without" a Leg Leveler is not available.			
3*	Start Button Assembly ("Flipper" Style)	0	Not Used
Item 3 includes the Switch. FOR SWITCH ONLY see Item 25 on the Next Page.			
4	Ball Shooter (Plunger) Assembly	1	500-6146-00-04
Item 4 is secured by: Support Plate (Qty. 1) (535-5027-00), #10-32 X 3/8" SHWH (Serr) Swage (Qty. 3) (237-5985-00) and #6 X 5/8" HWH AB (Zinc) (Qty. 2) (234-5002-00). FOR A BREAKDOWN OF PARTS see: Sec. 4, Chp. 2, Drawings for ... Assemblies...			
5	1"Ø Button (Red) + Lamp (#555 WB)	1	500-6388-02
Item 5 includes the Switch. FOR SWITCH ONLY see Item 25 on the Next Page.			
6	Flipper Button (Red) Assembly	2	500-5026-32
Item 6 is secured by: Pal Nut for Flipper Button (Metal) (Qty. 2) (240-5003-01) and is fitted with: O-Ring 11/32" X 7/32" X 1/16" (Qty. 1/per) (545-5850-00) Item 6 DOES NOT include the Switch. FOR SWITCHES ONLY see Items 23A/B on the Next Page.			
7	Rear Glass Channel 20-3/8" Length	1	545-5038-00
8	Plastic Channel 42-5/8" Lg. (Lt. & Rt.)	2	545-5017-00
9	Side Armor "with holes" (Lt. & Rt.)	2	535-7297-02
Item 9 is secured by: #10-24 X 1" Carriage Bolt Sq. Neck (2/per) (231-5021-00), #10-24 Hex Nut (2/per) (240-5202-00) and #8 X 5/8" PPH Black (2/per) (232-5101-01)			
10	Front Molding - Black	1	500-5757-02-00
Item 10 requires: Self-Adhesive Foam Rubber 3/8" X 3/16" X 20-3/8" (626-5001-00).			
11‡	Button Hole Plug (Blk) (Happ #52-6214-00)	1	500-6566-00

Nº	CABINET PART NAME	QTY.	SPI PART Nº
12*	P/F Glass (Tmprd.) 21" X 43" X 3/16"	1	660-5001-00
13	Hex Key Allen Wrench 5/16"	1	777-0001-00
14	Corrugated Tubing Black 1 1/4"Ø X 2.6" Lg.	2	605-5008-00
Above Item 14 covers the Cables Wiring Harnesses going into the Backbox from the Cab.			
15A	#1 Roto Lock Male (R2-0055-02)	1	355-5006-01
15B	#1 Roto Lock Female (on Backbox)	1	355-5006-02
Item 15A is secured by: #10-24 X 1-3/4" Carr. Bolt Sq. Neck (Qty. 2) (231-5022-00), #10-24 Nylon Stop Nut (Qty. 2) (240-5206-00) and #10 Washer 7/32" X .5" X 1/16" (Qty. 2) (242-5003-00)			
16	Coin Door (with Validator) USA only	1	500-5018-172
Item 16 is secured by: 1/4"-20 X 1-1/4" Carriage Bolt Sq. Neck (Qty. 4) (231-5003-00) 1/4"-20 Flange Nut (Qty. 4) (240-5300-00) and Fend Washer 1/4" I.D. X 1" O.D. (Qty. 3) (242-5009-00) NOTE: For Coin Door other than USA call Technical Support for SPI Part Nº.			
17	Coin Door Switch (USA)	2	180-5024-00
	FYI: Coin Door Switch (¥ Japan)	0	180-5091-00
18	Diagnostics Service Switches (X3)	1	180-5012-03
Item 18 is secured to Coin Door by: Diagnostics Sw. Bracket (Qty. 1) (535-6860-01)			
19	Slam Tilt Sw. (No Longer Required)	0	Not Used
20	Dual Switch Assembly	1	500-5808-00
ORDERING ABOVE (ITEM 20) ASSEMBLY PART Nº WILL INCLUDE:			
20A	Mounting Bracket	1	535-6958-00
20B	Playfield Power Interlock Sw. (Top)	1	180-5136-00
20C	Memory Protect Switch (Bottom)	1	180-5000-01
Item 20 is secured to Cabinet by: #8 X 1/2" HWH AB (Zinc) (Qty. 2) (234-5101-00)			

Parts Table & Views continue on the next page.





Take Note:

* An asterisk (*) indicates item(s) are not noted in the pictorials.

Legend Note: Items noted with a black square ■ are General Parts. Items noted with a white square □ are Switches.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
<i>Parts Table & Views continue on the previous page.</i>				32	Speaker Grill 7" X 7"	1	545-5072-03
21	Front Molding Lockdown Assembly	1	500-6509-00	Items 31 & 32 are secured by: #6-32 X 1-1/4" Fin Shank Screw (Qty. 4) (237-5883-00) and #6-32 Keps Nut (Qty. 4) (240-5008-00)			
Item 21 is secured by: #10-24 X 1-1/4" Carr. Bolt (Qty. 2) (231-5012-00), #10-24 Keps Nut (Qty. 2) (240-5207-00), #8 X 5/8" HWH AB Zinc (Qty. 4) (234-5102-04) and #10 Washer 7/32" ID X 1/2" OD X 1/16" (Qty. 2) (242-5003-00)				33	Power Input Box Sub-Assy.	1	515-5360-07
22	Lockdown Spring (connected to handle)	1	265-5008-00	ORDERING ABOVE (ITEM 33) SUB-ASSY. PART Nº WILL INCLUDE:			
23A	Flipper Switch - Self-Cleaning	2	180-5160-00	33A	Power Box (Plain)	1	535-5932-00
23B	Flipper Sw. - X2 Stack for Lwr./Up. Flipper(s)	0	180-5164-00	33B	Service Outlet (for USA)	1	180-5008-01
24*	Foam Strip (2 on 23A; 1 on 23B)	3	626-5042-00	33C	Line Cord 10' ROJ 3" Max.	1	034-5000-10
25	Start Button Switch (ONLY)	1	180-5174-00	33D	Recessed Cup for Line Cord	1	545-5122-00
26	Grills 2-1/2" X 18" (on Back & Bottom)	2	545-5072-02	33E	Line Filter	1	150-5000-00
27	Cabinet Plumb Bob Tilt Switch	1	See Parts Below	33F	Varistor TNR159211KM	1	150-5001-00
ORDER ONLY INDIVIDUAL PART(S) NEEDED:				33G	Fuse 8 Amp 250v Slo-Blo (Domestic)	1	200-5000-05
27A	Bracket for Hanger Wire	1	535-5221-00	33H	Fuse Holder	1	205-5001-00
27B	Hanger Wire	1	535-5319-00	33I	On/Off Switch Bracket	1	535-8318-00
27C	Contact Wire Form	1	535-7563-01	33J	On/Off Rocker Sw. (Arcoelectric C1350AB)	1	180-5001-01
27D	Plumb Bob Weight (includes Thumb-Screw)	1	535-5029-00	33K	Power Box Decal	1	820-6123-03
Items 27A & 27C are secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00)				34	Cash Box Plastic Bottom	1	545-5090-00
28A	Slide & Pivot Support Bracket - Right	1	535-5990-00	35	Cash Box Cover (Validator)	1	535-5013-03
28B	Slide & Pivot Support Bracket - Left	1	535-5989-00	36	Cash Box Lock Bracket (wire)	1	535-7562-00
Items 28A & 28B are secured by: #10-24 X 1-1/4" Carriage Bolt Sq. Neck (3/per) (231-5012-00) and #10-24 KEPS Nut (3/per) (240-5207-00)				37	Large Hair-Pin Clip	1	535-7772-00
29	Prop Rod	1	535-7553-00	38	Cabinet Light Bd. Assy. PLAYBOY	1	500-6558-00
Item 29 is secured by: #10-24 X 1-3/4" Carriage Bolt Sq. Neck (Qty. 1) (231-5022-00), Washer #10 7/32" ID X .5" OD X 1/16" Thk (Qty. 1) (242-5003-00) and #10-24 Nylon Stop Nut (Qty. 1) (240-5206-00)				ORDERING ABOVE (ITEM 38) ASSEMBLY PART Nº WILL INCLUDE:			
30	Transformer 5.7v AC (with Ballast Winding)	1	010-5012-01	38A	Cabinet Light Board Plain (Generic)	1	525-5609-00
Item 30 is secured by: 1/4"-20 X 5/8" PPH MS (Zinc) (Qty. 4) (237-5854-00) and 1/4" Split Lock Washer (Qty. 4) (244-5000-00)				38B	2-Lug Staple Down Socket	10	077-5000-00
31	Speaker 8" ø Rd. 8010 4Ω	1	031-5007-00	38C	#44 Bulb Yellow (Small Bayonet Type)	10	165-5053-06
				38D	Decal "-10" of Playboy Decal Set	1	from 820-6305-XX

Note: Individual Decals from a Decal Set cannot be ordered separately.

Item 38B is secured to Item 38A by: Staple (5/16") (Qty. 2/per) (631-5000-00)

Item 38 is secured to the Cabinet by: #8-32 X 1 1/2" HWH MS (Ser) Zinc (Qty. 2) (237-5946-00) and #8 Washer (Qty. 2) (242-5005-00)

Ordering Note: If 500-6558-00 is unavailable, order the individual part(s) actually required.

Playfield - General Parts ■ & Switches □ (Below)

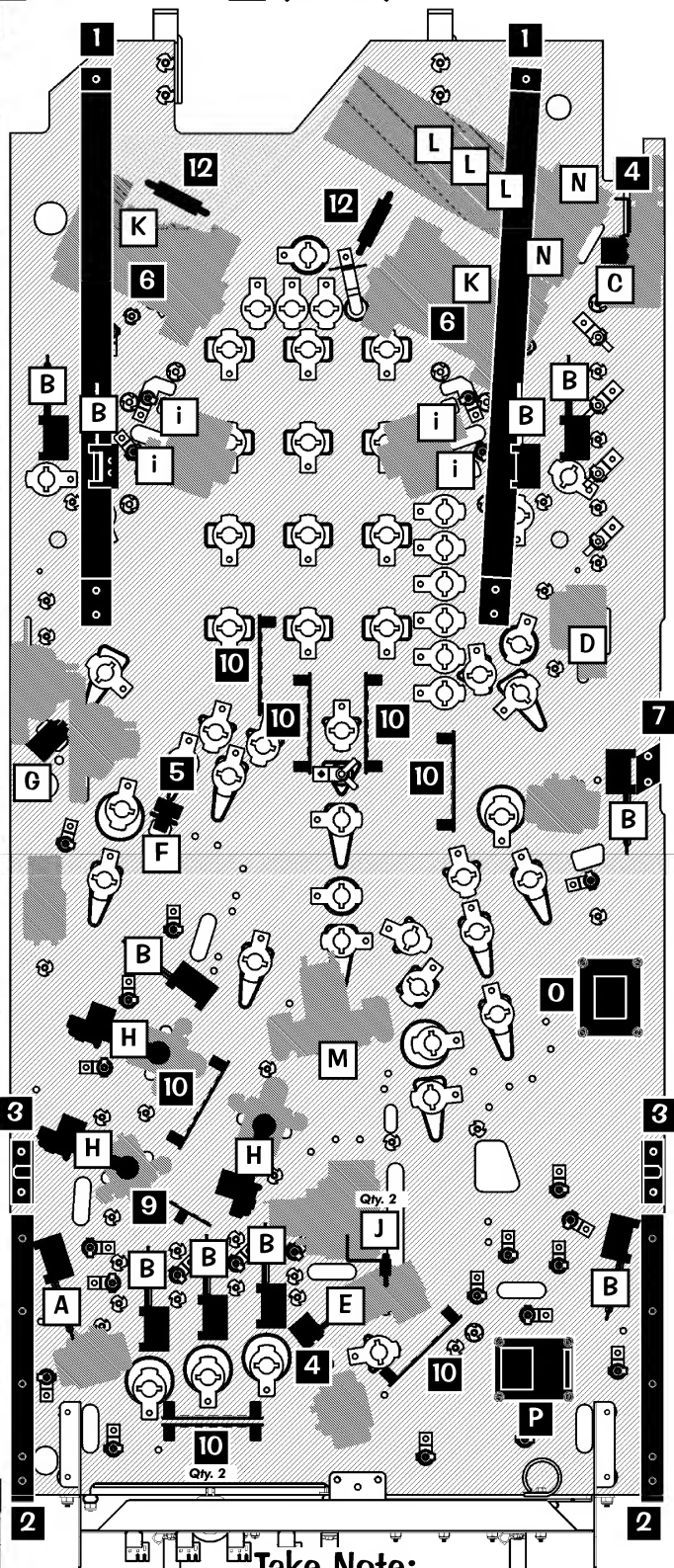
Nº	BELOW PLAYFIELD PART NAME	QTY.	SPI PART Nº
1	Playfield Support Slide Bracket	2	535-6862-02
Item 1 is secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 2/per) (234-5101-00) and #8-32 X 5/8" HWH Swage (Serr) Zinc (Qty. 1/per) (237-5975-03)			
2	Edge Slide Bracket (Extended)	2	535-5988-01
Item 2 is secured by: #4 X 1/2" PFH (Zinc) (Qty. 5/per) (237-5840-00)			
3	Pivot Pin Bracket Welded Assembly	2	500-5329-03
4	Switch Bracket (Shooter Lane / Eject Hole)	2	535-6173-00
Item 4 is secured by: #6 X 1/2" HWH AB (Zinc) Red (Qty. 2/per) (234-5001-02)			
5	Switch Back Plate (Stand-Up Target)	1	535-6452-00
	Target (Stand-Up) Bracket	1	535-6896-00
Item 5 requires: Foam Pad (Qty. 1) (626-5029-00) on Target Bracket.			
6	Insulation Fiche Paper (under Lwr. Flips)	2	545-5721-00
7	Gate Bracket (Rt.) Assy. (see next page)	1	500-6515-00
Item 7 is secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 2/per) (234-5101-00)			
8*	Diode Terminal Strip 2-Lug (810) Isolated	0	055-5203-00
However, Item 8 (Qty. 1) is located in the Cabinet on the Coin Door.			
9	Diode Terminal Strip 3-Lug (813) Isolated	1	055-5204-03
10	Diode Terminal Strip 5-Lug (824) Isolated	8	055-5204-05
11*	Diode Terminal Strip 7-Lug Isolated	0	055-5204-07
Items 9-10 are secured by: #6 X 3/8 HWH AB Zinc (Qty. 1-2/per) (234-5000-00). Note: 1N4004 Diodes (112-5003-00) are used in all Diode applications. 1N4001 Diodes can be used for Switches and/or Lamps. See Sec. 5, Chp. 2, Playfield Diode Terminal Strip...			
12	3A 250v Slo-Blo Fuse	2	200-5000-08
	Fuse Clip Holder (Socket)	2	205-5000-01
Item 12 is secured by: #6 X 1/2" PPH AB (Qty. 1/per) (237-5805-00) Note: Item 12, Fuse Clip Holder (Socket) 205-5000-01 is part of a set of 12 (205-5000-12). You can order them as individuals (...-01) or a set of 12 (...-12).			
13*	Diode Terminal Strip/Fuse Decals A-I	1	820-6221-76
Note: For Decal Descriptions & Locations, see Sec. 5, Chp. 2, Playfield Wiring, Page 101.			
14*	#8 Solder Lug	0	055-5140-08
However, Item 14 (Qty. 4) is located in the Cabinet on the Coin Door & Power Box.			

Nº	BELOW SWITCHES PART NAME	QTY.	SPI PART Nº
A	Micro Sw. Roll-Over Left Brkt. Assy.	1	500-6227-01
B	Micro Sw. Roll-Over Right Brkt. Assy.	10	500-6227-02
Items A & B are secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 2/per) (234-5101-00)			
C	Micro Switch (at Shooter Lane)	1	180-5157-00
D	Micro Sw. (Heavy Duty "Y" Flat Actuator)	1	180-5116-01
E	Micro Switch (Long Flat+Bent End Actuator)	1	180-5186-00
Items C-E require a Switch Body Protect Plate (535-6539-00) which is secured by: #2-56 X 1/2" HWH Serr (Qty. 2) (237-5937-02) and #2-56 Hex Nut (Qty. 2) (240-5301-00).			
F	Switch & Target Assy. Narrow (Red)	1	515-5967-02
Item F is secured by: #8 X 1/2" HWH AB (Zinc) (Qty. 2) (234-5103-00) For better view or entire assembly, see Appendix I, (end of manual).			
G	Modular S-U Target Square (Clear)	1	500-6139-01R
Item G is secured by: #8 X 3/4" HWH AB (Zinc) (Qty. 2) (234-5103-00) For better view or alternate colors, see Appendix I, (end of manual).			
H	Micro Switch (on Pop Bumpers)	3	180-5015-03
i	Stack (Blade) Switch (on Slingshots)	4	180-5054-00
J	Micro Switch (Roller Actuator, Reg. Force)	2	180-5119-00
Note: For how Item J can be replaced with 180-5119-02 if -00 is no longer available.			
K	EOS Switch Flipper (on Flippers)	2	180-5149-00
L	Micro Sw. (Roller Actuator, Lite Force)	3	180-5119-02
M	Micro Switch (on Drop Target)		180-5158-00
Note: For how Items H-M are secured or for a better view, see Section 4, Chapter 2, Drawings for Major Assemblies & Ramps, on the individual assemblies noted above.			

Nº	BELOW MISC. PCB PART NAME	QTY.	SPI PART Nº
N	Dual OPTO TRANS Bd. (on Ball Trough)		520-5173-00
	Dual OPTO REC Board (on Ball Trough)		520-5174-00

Note: For more details on Item N and a break-down of parts, see Section 5, Chapter 4, Printed Circuit Boards, Page 105. For how Item N is secured or for a better view, see Section 4, Chapter 2, Drawings for Major Assemblies & Ramps, Page 73.

O	Relay PC Board w/Solderd Harness	1	520-5010-00-76
Item O is secured by: #6 X 3/4" HWH AB (Zinc) (Qty. 4) (234-5003-00) and 3/8" Slt. Rtn. Spacer White (Qty. 4) (254-5007-01) Note: To order the Relay Board without the Solderd Harness (036-5161-00) attached, use 520-5010-00.			
P	DC Relay (Bi-Directional) PC Board	1	520-5066-00
Item P is secured by: #6 X 3/4" HWH AB (Zinc) (Qty. 4) (234-5003-00) and 3/8" Slt. Rtn. Spacer White (Qty. 4) (254-5007-01)			



Take Note:

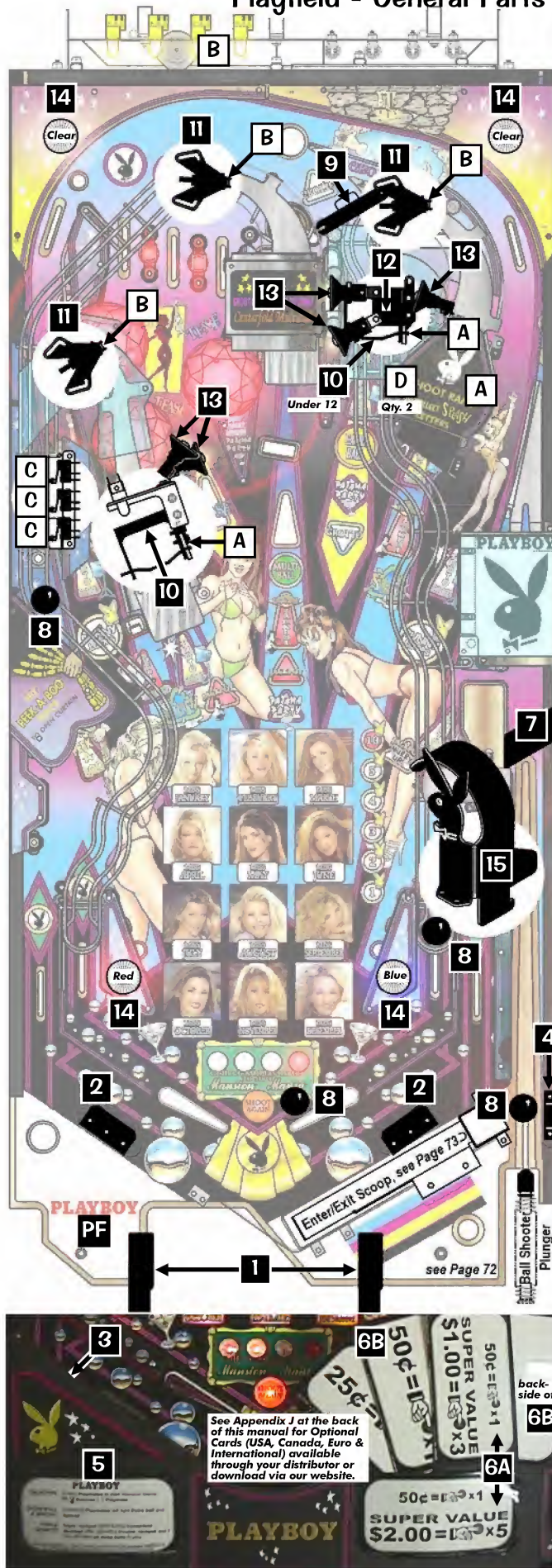
* An asterisk (*) indicates item(s) are not noted in the pictorials.

- For Sockets & Bulbs (drawings & part numbers) see Pgs. 68-70.
- Some items or parts may be included with or associated with a Major Assembly or Ramp Assembly; see the Blue Pages, Sec. 4, Chp. 2, for parts required not appearing on this page. If you still cannot find the part required, Call Stern™ Pinball Technical Support, 1-800-542-5377 or 1-708-345-7700 (Opt. 1).
- Legend Note:** Items noted with a black square ■ are General Parts. Items noted with a white square □ are Switches, OPTO Boards, or Misc. PC Boards.

Sec. 4: Parts Id. ...



Playfield - General Parts & Switches (Above)



Nº	ABOVE PLAYFIELD PART NAME	QTY.	SPI PART Nº
PF	P/F Screened w/ Inserts & NO Parts	1	830-5176-00
	P/F Complete w/ Inserts & ALL Parts	1	505-6004-76-76
1	Playfield Hanger Bracket	2	535-8385-00
Item 1 is secured to the P/F by: #8-32 X 7/8" HWH MS Zinc (Qty. 2/per) (237-5890-00)			
2	Arch Retaining (Hold-Down) Brackets	2	535-8394-00
Item 2 is secured to the Playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 3/per) (234-5101-00)			
3	Bottom Arch (Black Metal) w/o Forks	1	535-8392-01
Item 3 is secured to the playfield by: #10-32 X 5/16" PH FL U/C MS STL Zinc (Qty. 2) (237-6013-00). Usage Note: 535-8392-01 is used on games with a Ball Shooter Plunger ; 535-8392-00 is used on games with an Auto Launch Button . When replacing the Bottom Arch, order new replacement Nelson Protect Strips (not included) (Qty. 2) (545-5212-02). Note: Item 3 doesn't include Decals. For Decals, see Playfield - Plastics & Decals, Page 63.			
4	Level Assembly	1	515-7214-00
For Individual Items use : .882" 8MM Vial Mtg. Flange (545-6027-00), Level .8mm Empire #0224 (545-6001-01) or Level Bracket (535-9010-00). Flange secured by: #6-32 X 1/4" PPH MS (no Sems) Zinc (Qty. 1) (237-5500-00) and #6-32 Keps Nut (Qty. 1) (240-5008-00). Item 4 is secured to the wood rail by: #6 X 1/2" HWH AB Zinc Red (Qty. 2) (234-5001-02)			
5	Instruction Card (USA) Playboy	1	755-5176-10
Note: Visit www.sternpinball.com for a PDF copy of the Game Instruction Card which will also have any translated Instruction Cards made for this game. Find Game Link or Archives. Spanish 755-5176-02; German 755-5176-13; Italian 755-5176-14; French 755-5176-15.			
6A	Coin Card (2-Sided) New for 2002	1	755-5400-00
Note: This New Style Coin Card supercedes 755-5087-01/05 which is no longer available. Usage Note: Use Item 6A (Back: 1 Play 50c - 5 Plays \$2) for Adj. 6, Game Pricing, USA 5 Setting, or (Front: 1 Play 50c - 3 Plays \$1) for Adj. 6, Game Pricing, USA 8 Setting.			
6B	Coin Card (2-Sided) New for 2002	1	755-5400-02
Note: This New Style Coin Card supercedes 755-5087-01 which are no longer available. Usage Note: Use Item 6C (Front: 1 Play 50c) for Adj. 6, Game Pricing, USA 2-7 Setting, (Back: is Blank) for Custom Settings.			
Availability: See Appendix J at the back of this manual for more or optional Coin Cards (USA, Canada, Euro & other International) available through your distributor or download via our website www.sternpinball.com/coinagecards.htm (PDF Format). Coin Cards provided with this game depends on where the game was originally shipped from the factory.			
7	Gate Bracket (Right) Assembly	1	500-6515-00
Includes: Bracket RT (535-8977-00), RT Flap (535-8979-00), Hinge Pin RT (535-8982-00) and Nylon Washer (#90295A010) .065" ID X .179: OD X .078" (242-5069-00)			
Item 7 is secured under the Playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 2) (234-5101-00)			
8	Pinball (Steel) 1 1/8" ø	4	260-5000-00
9	1-Way Gate Mounting Bracket (Large)	1	535-9079-00
	Wire Gate (for above)	1	535-8441-01
10	Roll-Under Gate & Switch Assembly	2	515-7206-00
For Individual Items use : Roll-Under Switch Mounting Bracket (Black) (535-9041-00), Wire Gate (535-9043-48) and Micro Switch (180-5190-28).			
11	Cross-Under Gate & Switch Assembly	3	515-7231-00
For Individual Items use : Roll-Under Switch Mounting Bracket (Black) (535-9077-00) and Micro Switch (180-5190-48).			
Item 11 is secured by: #8-32 X 3/8" HWH Swage (Ser) Zinc (Qty. 2/per) (237-5975-00)			
12	Bracket, Dual Light Mounting (No Parts)	1	535-9138-00
Item 12 is secured to Clear Plastic -69 by: #6-32 X 3/8" PPH MS (Sems) Zinc (Qty. 2) (232-5201-00) onto 2" X 1/4" Hex Spacer #6-32 Tap (Qty. 1/per) (254-5008-07)			
13	Light Reflector (Silver Plastic)	5	545-5409-01
	Mini-Mars Light Cover (Snap-In) Clear	2	550-5030-01
	Mini-Mars Light Cover (Snap-In) Red	1	550-5030-02
	Mini-Mars Light Cover (Snap-In) Blue	1	550-5030-05
For Light Socket & Bulbs, see Page 70.			
15	VUK Exit Scoop, Playboy Bunny	1	535-9097-01
Item 15 is secured by: #8-32 X 1" HWH (Zinc) (Qty. 2) (237-6003-00)			
16	Back Panel Black Wood (No Parts)	1	525-5608-00
17*	Plug-Cap (3/16") Black Plastic	1	545-5232-01
Note: Item 17 should plug hole if a Center Post (@ Drain) is used, then removed.			

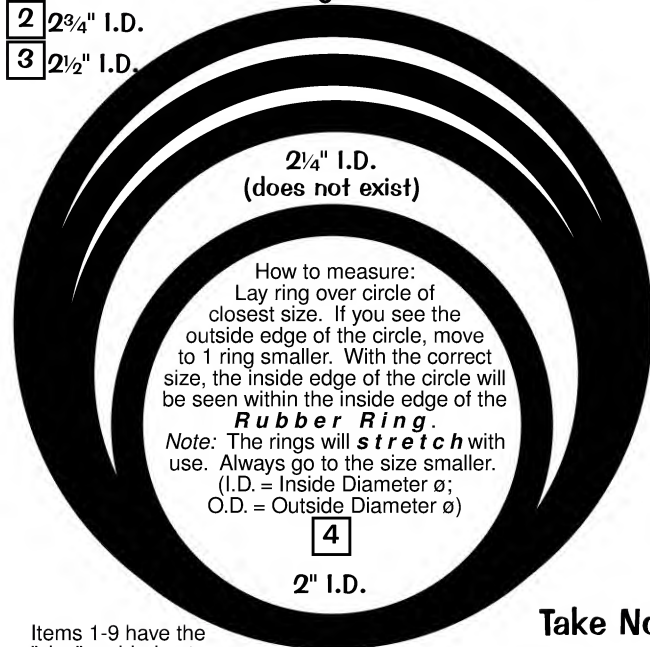
Nº	ABOVE SWITCHES PART NAME	QTY.	SPI PART Nº
A	Micro Switch (Short Flat Actuator)	3	180-5190-28
Item A requires a Switch Body Protect Plate (Qty. 1/ea.) (535-6539-00) which is secured by: #2-56 X 1/2" HWH Sr (Qty. 2) (237-5937-02) and #2-56 Hex Nut (Qty. 2) (240-5301-00).			
B	Micro Switch (Long Flat Actuator)	4	180-5190-48
C	Micro Switch (Roller Actuator, Lite Force)	3	180-5119-02
D	Micro Switch (Short Flat/Mid Bend Actuator)	2	180-5189-00
Items B-D are secured by: #2-56 X 1/2" HWH Serr (Qty. 2) (237-5937-02)			

Take Note:

- Some items or parts may be included with or associated with a Major Assembly or Ramp Assembly; see the Blue Pages, Sec. 4, Chp. 2. for parts required not appearing on this page. If you still cannot find the part required, Call Stern™ Pinball Technical Support, 1-800-542-5377 or 1-708-345-7700 (Opt. 1).
- Legend Note:** Items noted with a black square ■ are General Parts. Items noted with a white square □ are Switches.

- 1 3" I.D.
- 2 2¾" I.D.
- 3 2½" I.D.

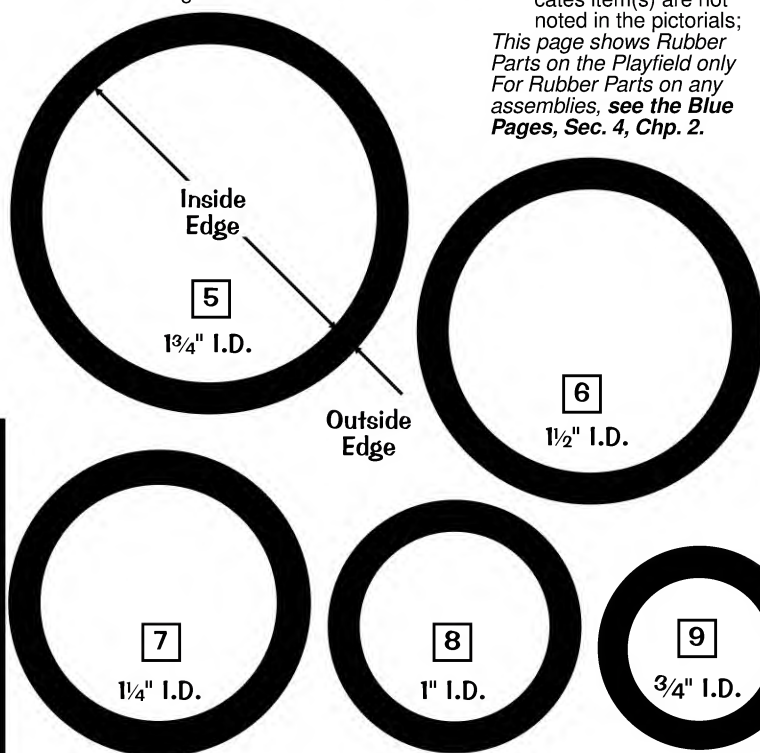
Playfield - Rubber Parts ■ □ (Rings Actual Size) †



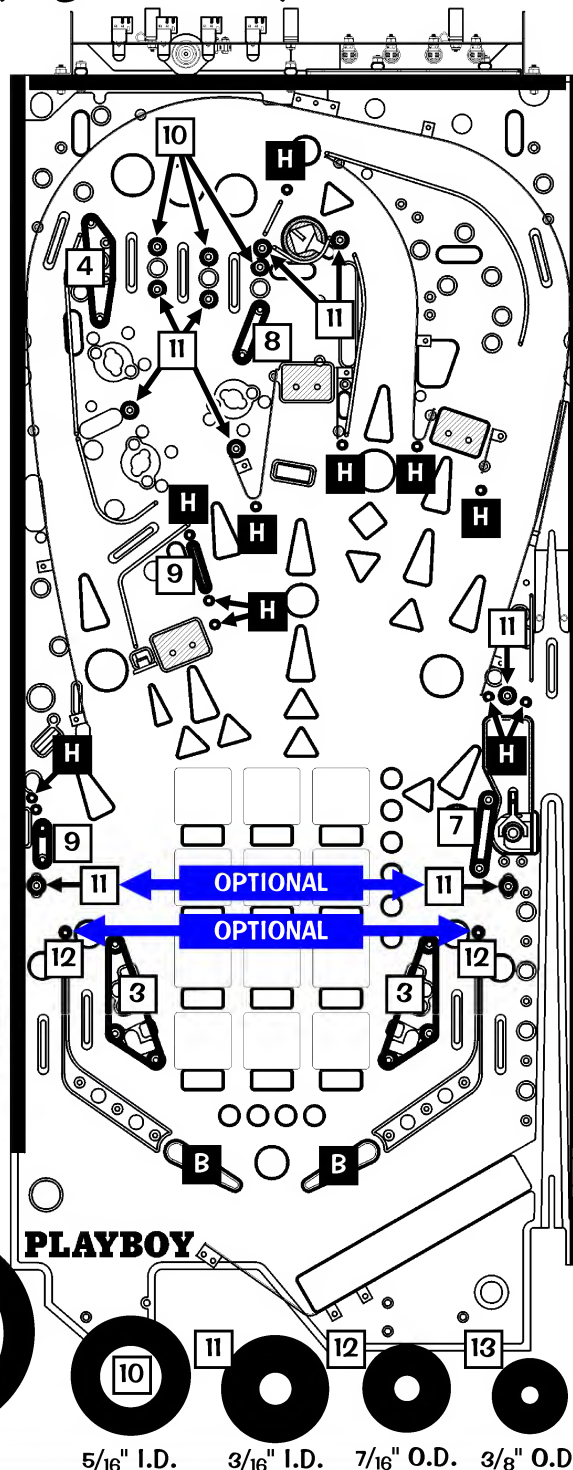
Items 1-9 have the "size" molded onto the Rubber Ring.

Take Note:

* An asterisk (*) indicates item(s) are not noted in the pictorials;
This page shows Rubber Parts on the Playfield only
For Rubber Parts on any assemblies, see the Blue Pages, Sec. 4, Chp. 2.



Sec. 4: Parts Id. ...



Nº	RUBBER PART NAME	QTY.	SPI PART Nº	Nº	RUBBER PART NAME	QTY.	SPI PART Nº
A	Small Flipper BLACK Rubber Ring	0	545-5207-00	4	2" I.D. BLACK Rubber Ring	1	545-5348-08
B	Large Flipper BLACK Rubber Ring	2	545-5277-00	5	1¾" I.D. BLACK Rubber Ring	0	545-5348-21
C*	Rubber Bumper (Deflector Pad)	2	545-5428-00	6	1½" I.D. BLACK Rubber Ring	0	545-5348-07
D*	Rubber Bumper (Grommet)	3	545-5105-00	7	1¼" I.D. BLACK Rubber Ring	1	545-5348-06
E	Rubber Bumper (Post)	0	545-5009-00	8	1" I.D. BLACK Rubber Ring	1	545-5348-05
F	Rubber Bumper (Flange)	0	545-5965-00	9	¾" I.D. BLACK Rubber Ring	2	545-5348-04
G	Rubber Bumper (Post Sleeve, Short)	0	545-5151-00	10	5/16" I.D. BLACK Rubber Ring	5*	545-5348-02
H	Rubber Bumper (Post Sleeve, Tall)	11	545-5308-00	11	3/16" I.D. BLACK Rubber Ring	9	545-5348-01
1	3" I.D. BLACK Rubber Ring	0	545-5348-10	12	7/16" O.D. BLACK Rubber Ring	2	545-5348-17
2	2¾" I.D. BLACK Rubber Ring	0	545-5348-20	13*	3/8" O.D. BLACK Rubber Ring	11	545-5348-19
3	2½" I.D. BLACK Rubber Ring	2	545-5348-09	14*	O-Ring 11/32" X 7/32" X 1/16" (on Flip Button)	2	545-5850-00

† Items with Ø Qty. are not used in this game.
Size and/or quantities may change during production.



Playfield - Plastics (Screened & Clear), Photo Inserts & Decals (Not Shown)*

in Back Panel, behind Drop Screen
-52 T9



for Centerfold
-61 T4
Top

for Centerfold
-62 T5
Middle

-63 T6
Bottom
for Centerfold

in Back Panel, behind Mirror
-51 T8

Mirror
820-6297-00
can be ordered separately.

PLAYBOY PLASTICS PART NAME	SPI PART N°
Screened Plastic Set -01 thru -28 (Not Used: -14, -15, -20, -21 -24)	1 830-5988-XX
Clear Plastic Set -50 thru 70 (Not Used: -58)	1 830-5989-XX

Attention: Individual Plastic Pieces are not available.
The entire Plastic Sheet Set must be ordered.

Take Note:

- To order the entire Plastic Sheet Set (Screened &/or Clear), use the above Part N° with the "-XX" ending.
- The following Plastics require riveting, if replaced:
-27 (Left Ramp Sign), and -65 (X2), -66 & -67 (Magazine Assembly), see the **Blue Pages** (Section 4, Chapter 2, Drawings for ... Assemblies & Ramps) for securing hardware.

in Triangle
-55 T2
goes in front of -56

in Triangle
-56 T2
goes behind of -55

in Triangle
-53 T3
goes in front of -54

in Triangle
-54 T3
goes behind of -53

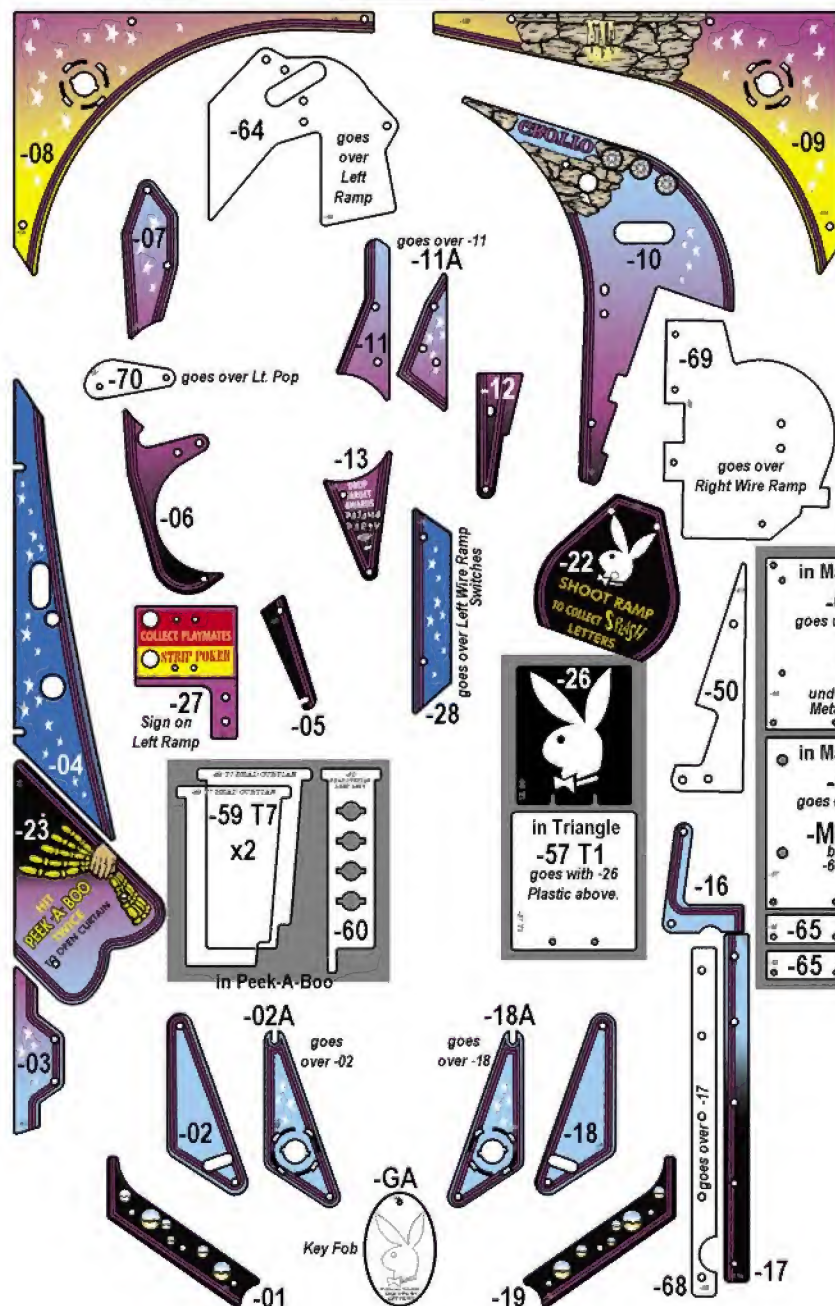
- GA (Key Fob) is provided for collecting (Not Used on game).
- If Clear Plastic -60 (Lamp Board in the Peek-A-Boo Assy.) requires replacement, **mark the socket and the corresponding hole with numbers as to not mix up the lamps.** See Pages 22-23 to verify that the Lamps were put back in the correct order per the Lamp Matrix.

REPLACING TRANSLITES:

To replace the **Translites**, match the "T#" on the Clear Plastics with the T# on the **Translites**.

Example: If replacing the picture on one side of the Triangle Mechanism, between Clear Plastics -53 & -54, note it has "T3" listed next to the 2-Digits. Find the matching shape Translite with "T3" and swap the pictures.

Screws securing the Clear Plastics together merely need to be loosened, not removed.
This game was provided with two (2) additional sets of different Models & poses.



in Magazine
-66
goes under -67

T0
under -66 on Metal Frame

in Magazine
-67
goes over -66

-MG TC
between -66 & -67

-65 both under -66

P'BOY MIRROR SPI PART N°
Plastic Mirror 820-6297-00

PHOTO INSERTS SPI PART N°
* Photo Inserts 830-5654-XX
* Photo Inserts Kit 502-5010-00

Attention: Individual Pieces are not available. The entire Set must be ordered. Using the Kit Part Number will include the Instruction Placement Sheet.

PLAYBOY DECALS SPI PART N°
* Decal Set 820-6305-XX

Attention: Individual Decals are not available. The entire Set must be ordered.
-01 Portals; -02 SPI Tech Sp; -03 Install 4 Balls;
-04 Bubble Level; -05 Shooter Lane; -06 SPI Coin Door;
-07 Center Up/Down Post (required for UK Only);
-08 / -09 Flipper Bats; -10 Cabinet Light Board;
-11 Arch Left; -12 Arch Center; -13 Arch Right;
-14 Magazine Inst.; -15 Skill Shot on Gate;
-16 / -18 Lt. & Bot. Pops; -17 Right Pop;
-19 White Panel Cover Up; -20 Drop Target;
-T4 X3 Text Side affixed to back of T4 Translite;
-T6 X3 Bunny Logo Side affixed to back of T6 Translite.

OPTIONAL MYLAR SPI PART N°
Optional Clear Playfield Set 820-5095-00
(Not Included with game)

Playfield - Rails ■, Wire Forms □ and Ball Guides ■ and Misc. Ramp ■ †

Nº	WOOD RAIL PART NAME	QTY.	SPI PART Nº
1	Wood Rail 38" (Left Side Playfield)	1	525-5007-03
2	Wood Rail (Right Side Playfield)	1	525-5607-00

Items 1 & 2 are secured by: #6 X 1-1/4" PFH A (Zinc) (Qty. 5/per) (237-5804-00)

Nº	METAL RAIL PART NAME	QTY.	SPI PART Nº
3	Metal Rail (Center Drain under Arch)	1	535-8393-00
4	Metal Rail (Full Orbit Loop)	1	535-8954-00
5	Metal Rail (Left of Drop Target/Center Ramp)	1	535-8958-00
6	Metal Rail (Right of Center Ramp)	1	535-8955-00
7	Metal Rail (Left of Middle Lane, Right Ramp)	1	535-8957-00
8	Metal Rail (Right of Right Ramp Enter)	1	535-9116-00

Items 3-8 are secured at Tabs by: #8 X 1/2" HWH AB (Zc.) (Qty. 1/per tab) (234-5101-00)

Nº	WIRE FORM PART NAME	QTY.	SPI PART Nº
A	Snubber Wire (Left of Eject Hole)	1	535-5373-02
B	Wire Form 3" (Left of Shooter Lane Ramp)	1	535-5300-02
C	Wire Form (on Ball Guide Rail)	2	535-5642-00

Items A-B are secured by the ends tapped into the playfield. Take care if removing.
Item C is secured at the top "loop" with the top screw of Item D below.

Nº	PLASTIC BALL GUIDE PART NAME	QTY.	SPI PART Nº
D	Plastic Ball Guide (Return Lane)	2	550-5307-01

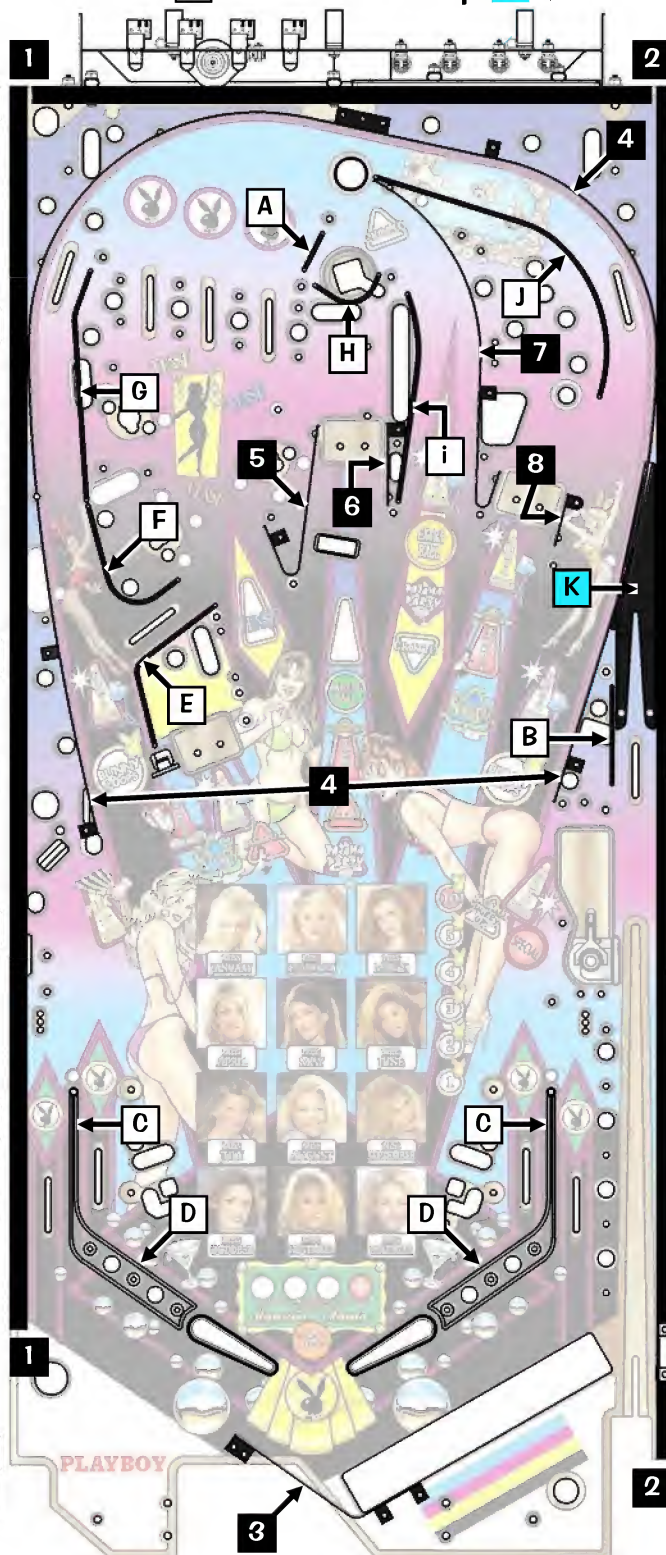
Item D is secured by: #6-32 X 3/4" PPH MS (Zinc) (Qty. 4/per) (237-5511-00)

Nº	METAL BALL GUIDE PART NAME	QTY.	SPI PART Nº
E	Metal Ball Guide (Bottom Pop Exit Lane)	1	535-8959-00
F	Metal Ball Guide (Left Orbit, Lower)	1	535-8960-00
G	Metal Ball Guide (Left Orbit, Upper)	1	535-8962-00
H	Metal Ball Guide (Under Eject Hole)	1	535-9075-00
i	Metal Ball Guide (Right of Center Ramp)	1	535-9098-00
J	Metal Ball Guide (Upper Right Orbit)	1	535-9099-00

Items E-J are secured by the ends tapped into the playfield. Take care if removing.

Nº	MISC. RAMP PART NAME	QTY.	SPI PART Nº
K	Shooter Lane Ramp	1	535-9051-00

Item K is secured by: #4 X 1/2" PFH (Zinc) (Qty. 2) (237-5840-00)



Sec. 4: Parts Id. ...



Playfield - Metal Posts (Screws) and Nuts (Actual Size) †



Item 1 Post can use
3/16" I.D. Rubber Ring,
545-5348-01;
or if Item 1 Post is
used in pairs, can use
3/4" — 3" Rubber Rings.

Items 2 & 4 Posts can use
7/16" O.D. Rubber Ring,
545-5348-17.



2



3



4



5



6



7



8



9



10



11



12



13



14



15



16



17



18

Item 16 is typically used to hold Hex
Spacers onto the Playfield Top.

Item 17 is typically used to hold the
bottom Cabinet Speaker (used with
#6-32 Nylon Stop Nut, 240-5005-00).

Item 18 is typically used to hold Item
15 (515-5939-00) in Turbo Bumper
Assy., 515-6459-04.

Note: The "Fins" keep the screw
from turning inside the wood hole.

† Items with a Zero Qty. are not used in this game.
Size and/or quantities may change during production.

Nut Note: All nuts shown with a "✓" are used in this game. The quantities (not specified) vary.
The remaining items listed are not used in this game and are noted for reference only (used in prior games).

Shown Below~
• #6-32
Nylon Stop Nut:
240-5005-00 ✓



Top & Side Views
Nylon Stop Nuts
Not Shown:

• #6-32
(w/ 1/4" Hex Body):
240-5010-00 ✓
• #8-32:
240-5102-00 ✓
• #10-32:
240-5203-00 ✓
• #10-24:
240-5206-00 ✓
• #4-40:
240-5303-00 ✓
• #4-40
(18/8 Stainless):
240-5303-01
• 5/16"-18:
240-5316-00

Shown Below~
• #6-32
KEPS Nut
(with Star Washer):
240-5008-00 ✓



Bottom & Side Views
KEPS Nuts
Not Shown:

• #6-32
(w/ 1/4" Hex Body):
240-5011-00
• #8-32:
240-5104-00 ✓
• #10-32:
240-5208-00 ✓
• #10-24:
240-5207-00 ✓
• #4-40:
240-5318-00

Shown Below~
• #6-32
Hex Nut
(No Star Washer):
240-5004-00 ✓



Top View
Hex Nuts
Not Shown:

• #8-32:
240-5103-00
• #10-32:
240-5201-00
• #10-24:
240-5202-00 ✓
• #10-32 X 3/8":
240-5209-00
• 3/4-16:
240-5315-00
• #2-56:
240-5301-00 ✓
• 7/8"-14:
240-5317-00

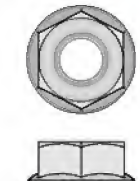
Shown Below~
• #6-32
T-Nut:
240-5002-00 ✓



Bottom & Side Views
T-Nuts
Not Shown:

• #6-32
(w/Side Cut Off):
240-5002-01
• #8-32:
240-5101-00 ✓
• #10-32
(Black Oxide):
240-5007-00
• #10-32
(w/Side Cut Off):
240-5205-00
• #10-24:
240-5200-00

Shown Below~
• 1/4" X 20
Flange Nut:
240-5300-00 ✓



Top & Side Views
Miscellaneous Nuts
Not Shown:

• Plastic Pal Nut
(on Flipper Buttons):
240-5003-00
• Metal Pal Nut
(on Flipper Buttons):
240-5003-01 ✓
• #6-32 Wing Nut:
240-5001-00
• #8-32 Wing Nut:
240-5100-00
• 1/4"-20 Wing Nut:
240-5302-00
• 1/4"-20 Toggle Wing:
240-5324-00

Nº	METAL POST NAME	QTY.	SPI PART Nº	Nº	METAL POST NAME	QTY.	SPI PART Nº
1	Stand-Off Double Groove Post 1 1/8"	0	530-5102-01	10	Post #6-32 Tap / #6-32 Bottom	0	530-5127-00
2	Mini-Post Wood Screw	0	530-5004-00	11	Post Hex Base #6-32 Tap/#10-32 Bot.	4	530-5332-01
3	Mini-Post Wood Screw (no cut-away)	3	530-5004-01	12	Post Hex Base (No Tap)/#10-32 Bot.	4	530-5332-00
4	Mini-Post Mach. Screw / #10-32 Bot.	6	530-5005-00	13	Post Hex Base #8-32 Top/#10-32 Bot.	0	530-5332-02
5	Post Fasten #6-32 Top / #8-32 Bot.	0	530-5007-00	14	Post Hex Base #6-32 Top/#10-32 Bot.	2	530-5332-03
6	Post Fasten #8-32 Top / #6-32 Bot.	2	530-5008-00	15	Playfield Support #8-32 Top/Bottom	0	530-5285-00
7	Post Fasten #6-32 Top / #6-32 Bot.	19	530-5012-02	16	#6-32 X 3/4" Fin Shank Screw	0	237-5921-02
8	Post Fstr. #6-32 Top / Wood Scr. Bot.	6	530-5010-02	17	#6-32 X 1 1/4" Fin Shank Screw	4	237-5883-00
9	Post #6-32 Top / Wood Screw Bottom	0	530-5263-01	18	#6-32 X 1 3/16" Spirol Fin Shank Screw	9	237-5957-00

Playfield - Metal Spacers (Actual Size) †

A Standard USA 9 Inch Ruler is provided on the back cover.

Hex Spacers:

#6-32

Tap



1/4"

1

1/4"

2

3/8"

3A

1/2"

4A

5/8"

5

3/4"

6A

7/8"

7

1"

8A 1 1/8"

8B example of "Bs" 1 1/8" Take Note:

Items 1-33 are 1/4" wide. Items 35-46 are 5/16" wide. With Items 1-3A, 4A, 5 & 6A (the tap goes thru the length of spacer. With Items 7, 8A, 9-33 & 41-46, the tap is up to 5/8" deep on each end. **Note:** Items 3B, 4B, 6B (Not Shown) & 8B (Shown as example of all "B" Styles) have 1 Male End #6-32 Thread, the other end is Female, identical to Items 7-33.

9 1 1/4"

10 1 5/16"

11 1 3/8"

12 1 1/2"

13 1 5/8"

14 1 3/4"

15 1 7/8"

16 2"

17 2 1/8"

18 2 1/4"

19 2 3/8"

20 2 1/2"

21 2 5/8"

22 2 3/4"

29 3 3/4"

28 3 5/8"

27 3 1/2"

23 2 7/8"

31 4 3/8"

32 4 1/4"

30 4"

25 3 3/8"

26 3 1/4"

24 3"

35 1/4"

36 1/2"

37 9/16"

38 3/4"

39 1 1/8"

40 1"

Note the Part No & Material Difference

‡ Hex Spacers Not Used in current games may no longer be available. Choose one size up or down (+/-) and compensate with washers.

41 1 1/4"

42 1 3/4"

43 2"

44 4"

45 4 5/16"

46 4.92"

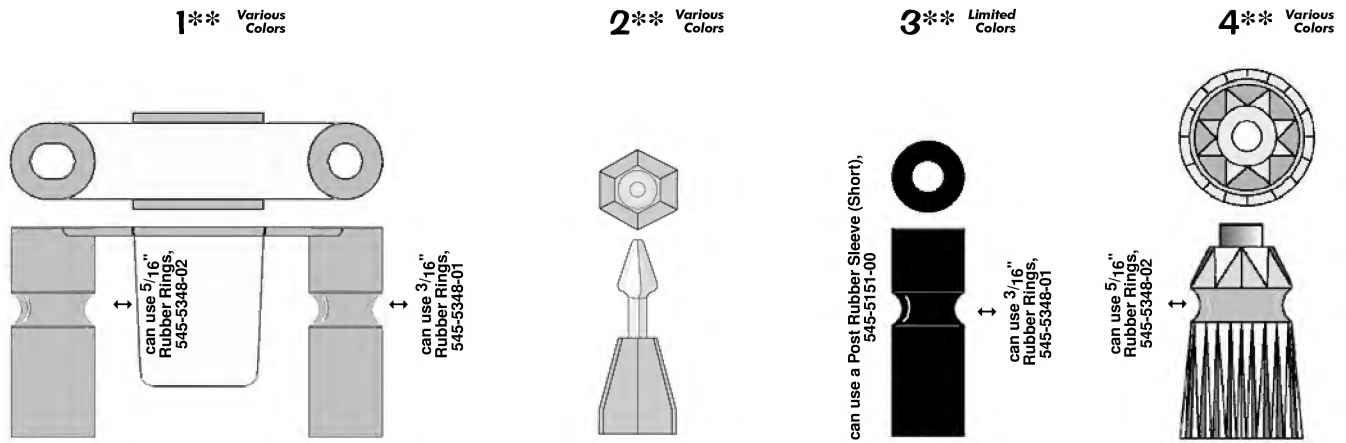
Sec. 4: Parts Id. ...

Nº	METAL SPACER NAME	QTY.	SPI PART Nº	Nº	METAL SPACER NAME	QTY.	SPI PART Nº
1	1/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-00	22	2 3/4" X 1/4" Hex Spacer #6-32 Tap	1	254-5008-15
2	3/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-12	23	2 7/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-31
3A	1/2" X 1/4" Hex Spacer #6-32 Tap	7	254-5008-03	24	3" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-14
3B	Same as 3A but with Male End #6-32	0	254-5024-03	25	3 1/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-19
4A	5/8" X 1/4" Hex Spacer #6-32 Tap	2	254-5008-02	26	3 1/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-26
4B*	Same as 4A but with Male End #6-32	0	254-5024-02	27	3 1/2" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-27
5	3/4" X 1/4" Hex Spacer #6-32 Tap	1	254-5008-04	28	3 5/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-25
6A	7/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-05	29	3 3/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-36
6B*	Same as 6A but with Male End #6-32	0	254-5024-05	30	4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-21
7	1" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-06	31	4 1/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-30
8A	1 1/8" X 1/4" Hex Spacer #6-32 Tap	1	254-5008-17	32	4 3/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-29
8B	Same as 8A but with Male End #6-32	0	254-5024-17	33*	5 1/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-35
9	1 1/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-11	34	3/8" X 1/2" Spacer (Used with Backbox)	2	530-5099-00
10	1 5/16" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-34	35	1/4" X 5/16" X .144" I.D. Spacer Tap	1	254-5014-03
11 ‡	1 3/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-33	36	1/2" X 5/16" X .144" I.D. Spacer Tap	3	254-5014-00
12	1 1/2" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-09	37	9/16" X 5/16" X .144" I.D. Spacer Tap	0	254-5014-04
13 ‡	1 5/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-13	38	3/4" X 5/16" X .144" I.D. Spacer Tap	0	254-5014-01
14	1 3/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-10	39	1 1/8" X 5/16" X .144" I.D. Spacer Tap	0	254-5014-02
15 ‡	1 7/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-20	40	1" X 5/16" X .144" I.D. Spacer Tap	0	254-5001-00
16	2" X 1/4" Hex Spacer #6-32 Tap	2	254-5008-07	41	1 1/4" X 5/16" Hex Spacer #6-32 Tap	0	254-5018-09
17	2 1/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-32	42	1 3/4" X 5/16" Hex Spacer #6-32 Tap	0	254-5018-06
18	2 1/4" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-18	43	2" X 5/16" Hex Spacer #6-32 Tap	0	254-5018-07
19	2 3/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-28	44	4" X 5/16" Hex Spacer #6-32 Tap	0	254-5018-03
20	2 1/2" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-16	45	4 5/16" X 5/16" Hex Spacer #6-32 Tap	0	254-5018-00
21	2 5/8" X 1/4" Hex Spacer #6-32 Tap	0	254-5008-08	46	4.92" X 5/16" Hex Spacer #6-32 Tap	0	254-5018-04

* Items with a Zero Qty. are not used in this game. Size and/or quantities may change during production.



Playfield - Plastic Posts and Spacers (Actual Size) †

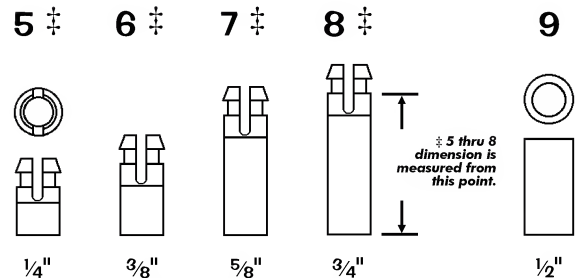


Take Note:

PLASTIC PART COLOR CHART					
Nº	Color	Nº	Color	Nº	Color
-00	Black	-06	Yellow	-12	Fluor. Blue
-01	Clear	-07	Orange	-13	Teal Green
-02	Red	-08	White	-14	Gray
-03	Amber	-09	Purple	-15	Luminescent
-04	Green	-10	Fluor. Orange	-16	Gold
-05	Blue	-11	Fluor. Green		

** Items 1, 2 & 4 come in various colors (may not be available in every color). Item 3 is currently only available in the color stated in this game manual (other colors used in prior games may no longer be available). The "-XX" in Part N°s which may come in various colors should be replaced with the desired 2-Digit N°. corresponding to the color desired. Some colors may no longer be available for desired item.

Items 3-4 Posts used in pairs can use 3/4" through 3" Rubber Rings, (See Rubber Parts for Part N°s).

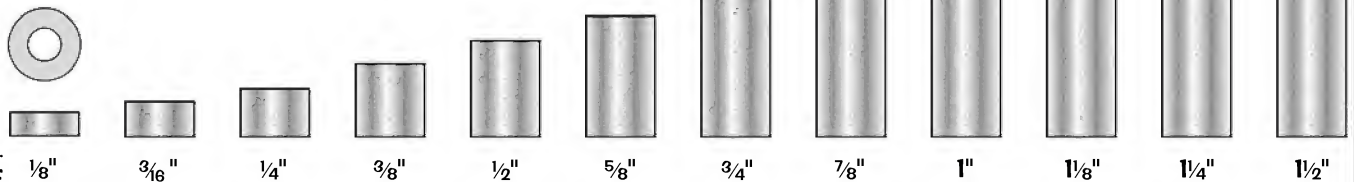


† Items 5 through 8 (Board Spacers) dimensions are measured from bottom to just under cut-away (see pictorial with Item 8 above).

10 11 12 13 14 15 16 17 18 19 20 21

Take Note:

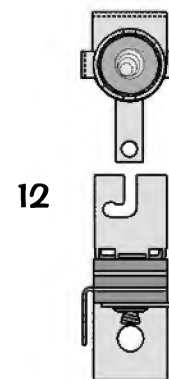
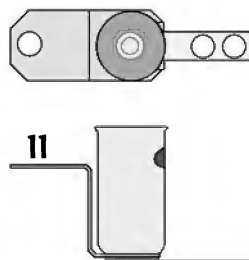
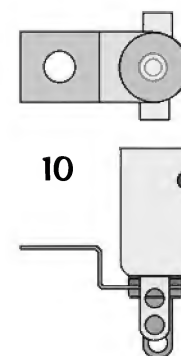
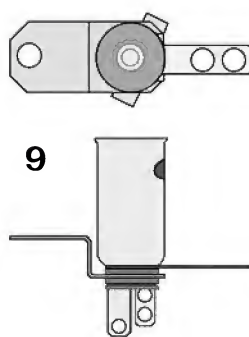
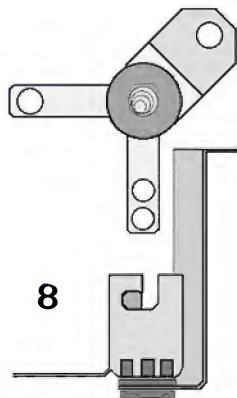
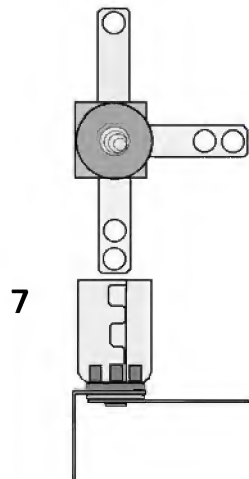
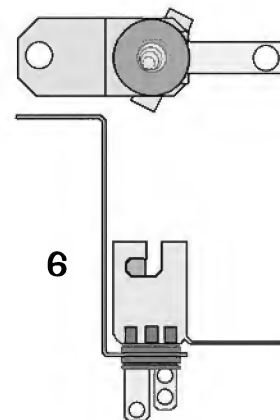
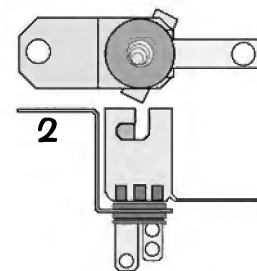
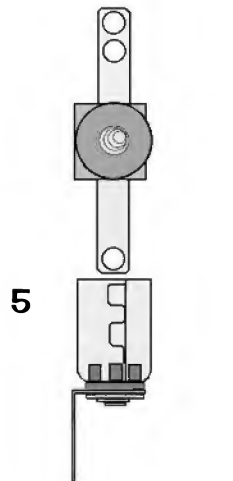
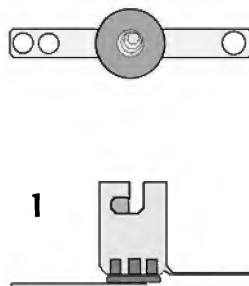
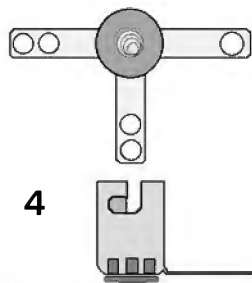
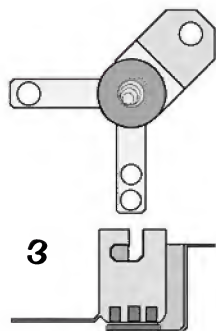
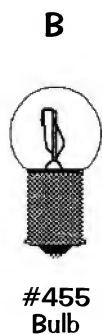
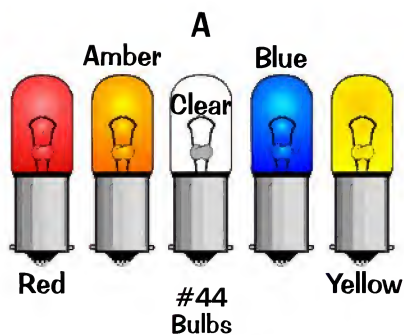
If any one of Items 10-21 Spacers is not available in the size required, order the smaller sized spacers required to stack sizes together until appropriate size is achieved (e.g. If 1 1/8" is needed but unavailable, order a 1/2" + 5/8" & stack to = 1 1/8").



† Items with a Zero Qty. are not used in this game. Size and/or quantities may change during production.

Nº	PLASTIC POST/SPACER NAME	QTY.	SPI PART Nº	Nº	PLASTIC POST/SPACER NAME	QTY.	SPI PART Nº
1**	Top Lane Mini-Light Hood (Red)	3	550-5061-02	10	1/8" X 3/8" Spacer Gray	0	254-5000-19
Item 1 typically secured by: #6-32 X 1-3/4" PPH MS (Zinc) (Qty. 2/per) (237-5511-00) and Washer 9/64" X 5/16" OD X 1/32" (Qty. 2/per) (242-5017-00)				11	3/16" X 3/8" Spacer Gray (4 for Dot Display)	6	254-5000-18
2**	Mini-Jewel Post Clear	0	550-5052-01	12	1/4" X 3/8" Spacer Gray	0	254-5000-02
Item 2 typically secured by: #6 X 3/8" HWH AB (Zinc) (Qty. 1/per) (234-5000-00)				13	3/8" X 3/8" Spacer Gray	17	254-5000-12
3**	1 1/16" Single Groove Post (Black)	46	550-5059-00	14	1/2" X 3/8" Spacer Gray	0	254-5000-01
4**	Single Groove Jewel Post (Clear)	11	550-5034-01	15	5/8" X 3/8" Spacer Gray	0	254-5000-14
Items 3 & 4 typically secured by: Post Fastening Screw #6-32 Top / #6-32 Bottom (Qty. 1/per) (530-5012-02, Item 7 Page 59)				16	3/4" X 3/8" Spacer Gray	5	254-5000-07
5 †	1/4" Slf. Rtn. Spacer White	0	254-5007-02	17	7/8" X 3/8" Spacer Gray	0	254-5000-11
6 †	3/8" Slf. Rtn. Spacer White	4	254-5007-01	18	1" X 3/8" Spacer Gray/Black	0	254-5000-04
7 †	5/8" Slf. Rtn. Spacer White	0	254-5007-00	19	1 1/8" X 3/8" Spacer Gray	0	254-5000-06
8 †	3/4" Slf. Rtn. Spacer White	0	254-5007-03	20	1 1/4" X 3/8" Spacer Gray	0	254-5000-05
9	1/2" X 1/4" Spacer White (Narrow)	0	254-5000-03	21	1 1/2" X 3/8" Spacer Gray	3	254-5000-08

Playfield - Small Bayonet Type Bulbs and Sockets (Actual Size) †



Sec. 4: Parts Id. ...

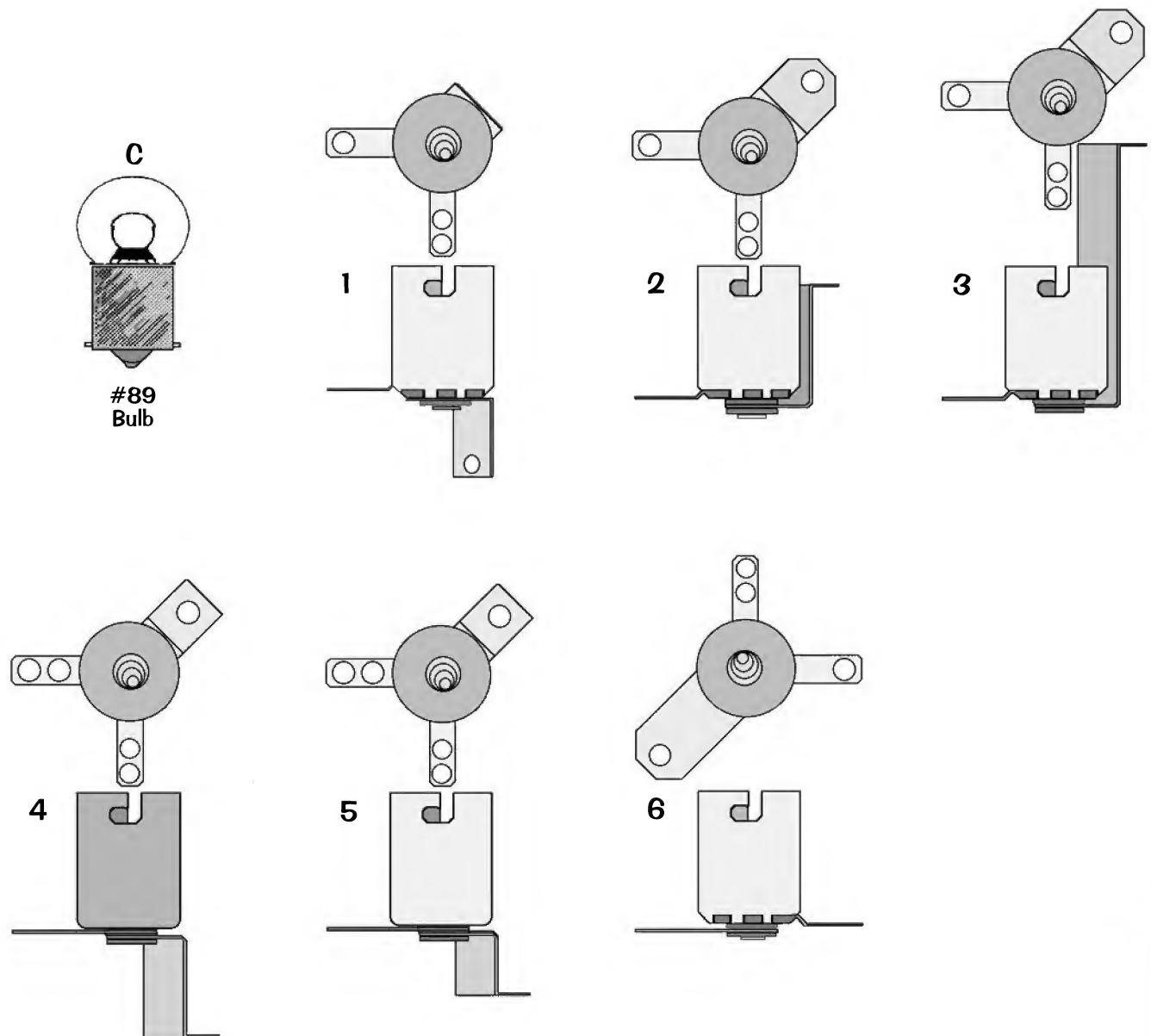
Nº	SMALL BULB & SOCKET NAME	QTY.	SPI PART Nº
A	#44 Bulb (Clear)	30	165-5000-44
A	#44 Bulb (Red)	0	165-5053-02
A	#44 Bulb (Amber)	0	165-5053-03
A	#44 Bulb (Blue)	0	165-5053-05
A	#44 Bulb (Yellow)	10	165-5053-06
B	#455 Twinkle Bulb	0	165-5003-00
1	2-Lug Staple Down Socket	13	077-5000-00
2	3-Lug Stand-Up Short Socket	0	077-5008-00
3	2-Lug Stand-Up Short Socket	4	077-5002-00
4	3-Lug Staple Down Socket	0	077-5001-00
5	2-Lug Laydown Socket	0	077-5003-00
6	3-Lug Stand-Up Long Socket	0	077-5009-00
7	3-Lug Laydown Socket (3 Lugs Flat)	1	077-5006-00
8	2-Lug Stand-Up Long Socket	0	077-5005-00
9	3-Lug Stand-Up Long Shell Socket	0	077-5013-00
10	2-Lug Stand-Up Lg. Shell Socket (Gls)	22	077-5031-00

Nº	SMALL BULB & SOCKET NAME	QTY.	SPI PART Nº
11	1-Lug Stand-Up Long Shell Socket	0	077-5012-00
12	3-Lug Laydown Socket (2 Lugs Bent)	0	077-5032-00

† Items with a Zero Qty. are not used in this game. Size and/or quantities may change during production.



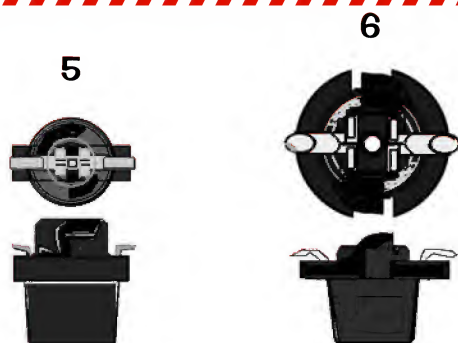
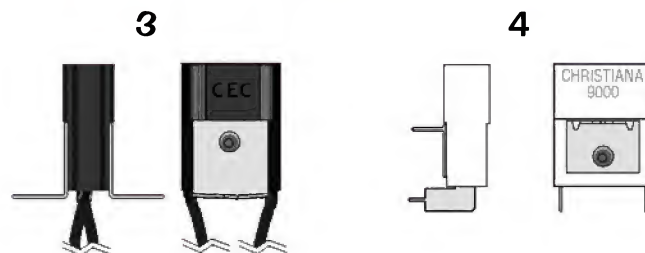
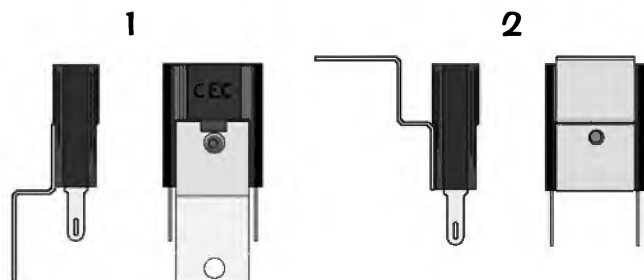
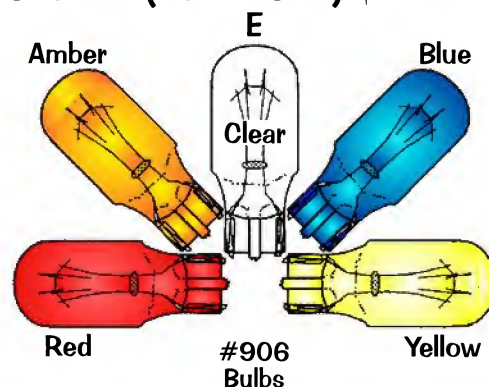
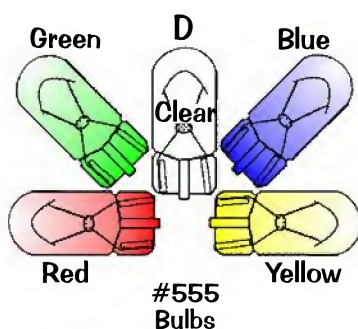
Playfield - Large Bayonet Type Bulb and Sockets (Actual Size) †



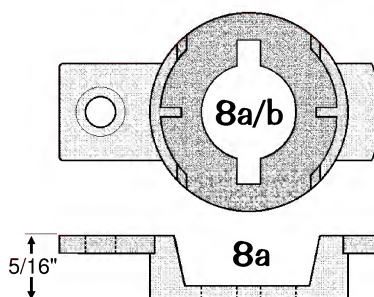
† Items with a Zero Qty. are not used in this game. Size and/or quantities may change during production.

Nº	LARGE BULB & SOCKET NAME	QTY.	SPI PART Nº	Nº	LARGE BULB & SOCKET NAME	QTY.	SPI PART Nº
C	#89 Bulb	2	165-5000-89	4	Stand-Up Socket Rev. Short	0	077-5103-00
1	Laydown Standard Socket	0	077-5100-00	5	2-Lug Stand-Up Small Socket	1	077-5106-00
2	2-Lug Stand-Up Short Socket	0	077-5101-00	6	Straight Leg Socket	0	077-5107-00
3	2-Lug Stand-Up Long Socket	1	077-5102-00				

Playfield - Wedge Base Bulbs and Sockets (Actual Size) †



8a/b Top View (8b Side View is Not Shown)



Take Special Note

Item 7a is an IDC (Insulation Displacement Connection) Style Socket (this style is solderless). This socket is secured to the playfield or component by Items 8a or 8b Snap-On Socket Brackets, or may also be snapped into Item 9 Socket Mounting Plastic Board (used only when sockets are positioned closely together or in a special application).

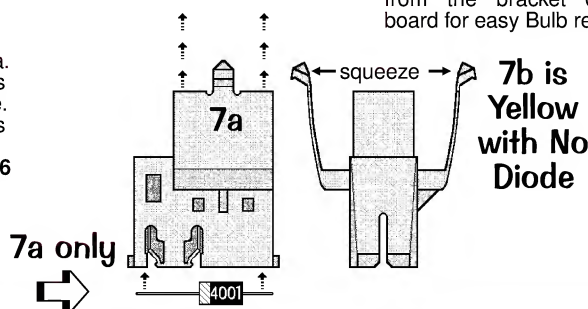
Just squeeze the "side arms" of the socket together and pull away from the bracket or mounting board for easy Bulb replacement.

Take Note:

* An asterisk (*) indicates item(s) are not noted in the pictorials.

- Item 3 Socket has 2 Wires attached are approximately 12" ea.
- Item 4 Socket **was** used on PC Light Boards to position bulbs horizontally; Item 4 Socket is secured by soldering into place.
- Item 5 Socket **was** used on PC Light Boards to position bulbs vertically; Item 5 Socket is secured by "twisting" into place.
- Item E Bulb (#906) is normally used in conjunction with Item 6 Socket, but **can** be used with Items 1, 2, 4 or 7a/b.
- Item 7a Socket is equipped with a *built-in* Diode, 1N4003 (112-5003-00), however, replacement can be made with a 1N4001 Diode (112-5001-00). Item 7b Socket is **NOT** equipped with a diode (not required).

Note: Always replace with same type bulb in original application.



7b is Yellow with No Diode

Nº	WEDGE BULB & SOCKET NAME	QTY.	SPI PART Nº	Nº	WEDGE BULB & SOCKET NAME	QTY.	SPI PART Nº
D	#555 Wedge Base Bulb (Clear)	79	165-5002-00	1	#555 Wedge Base Socket (Laydown)	13	077-5026-01
D	#555 Wedge Base Bulb (Red)	1	165-5054-02	2	#555 Wedge Base Socket (Offset)	2	077-5029-00
D	#555 Wedge Base Bulb (Green)	0	165-5054-04	3	#555 W.B. Socket (for Pop Bumper)	3	077-5206-00
D	#555 Wedge Base Bulb (Blue)	0	165-5054-05	4	#555 W.B. Socket (Solder Type)	0	077-5207-00
D	#555 Wedge Base Bulb (Yellow)	1	165-5054-06	5	#555 Wedge Base Socket (Twist)	0	077-5007-00
E	#906 Wedge Base Bulb (Clear)	9	165-5004-00	6	#906 Wedge Base Socket (Twist)	0	077-5016-00
E	#906 Wedge Base Bulb (Red)	0	165-5004-02	7a	#555 IDC Snap-On Socket	59	077-5216-00
E	#906 Wedge Base Bulb (Amber)	0	165-5004-03	7b	#555 IDC Snap-On Socket No Diode	13	077-5216-01
E	#906 Wedge Base Bulb (Blue)	0	165-5004-05	8a	5/16" Ht. Snap-On Socket Bracket	57	545-5760-18
E	#906 Wedge Base Bulb (Yellow)	0	165-5004-06	8b*	19/32" Ht. Snap-On Socket Bracket	0	545-5760-19
				9a*	Clear Plastic Socket Mtg. Bd. (4/per)	1	(830-5989-XX)

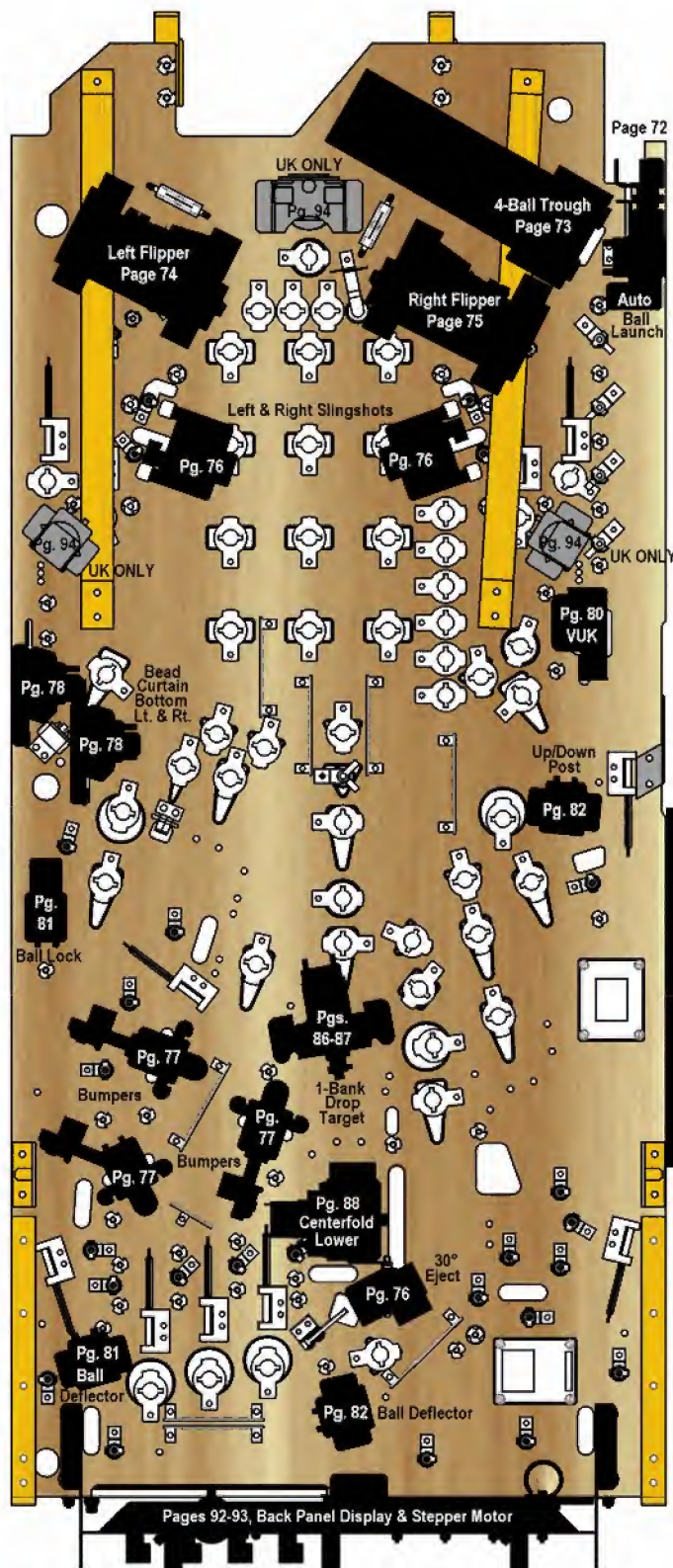
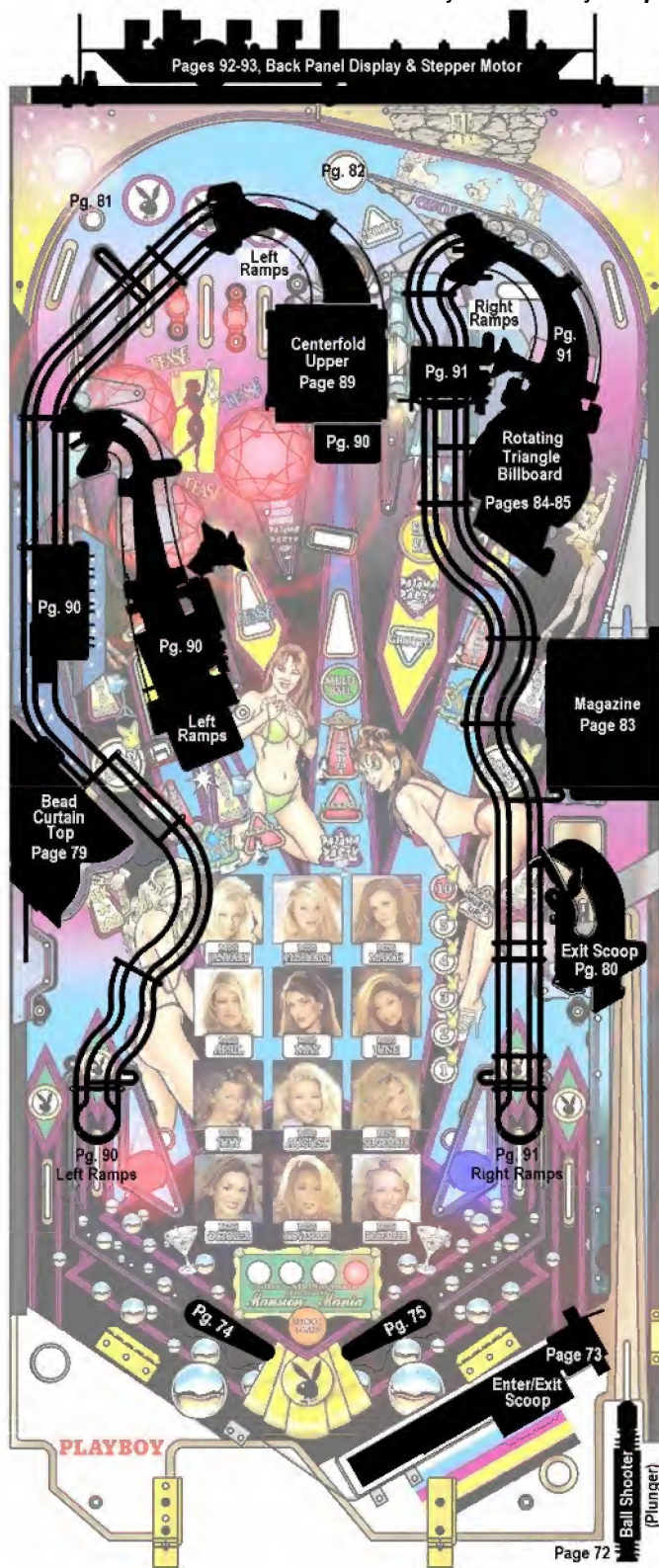
† Items with a Zero Qty. are not used in this game. Size and/or quantities may change during production.



Drawings for Major Assemblies & Ramps (The Blue Pages)

Overview

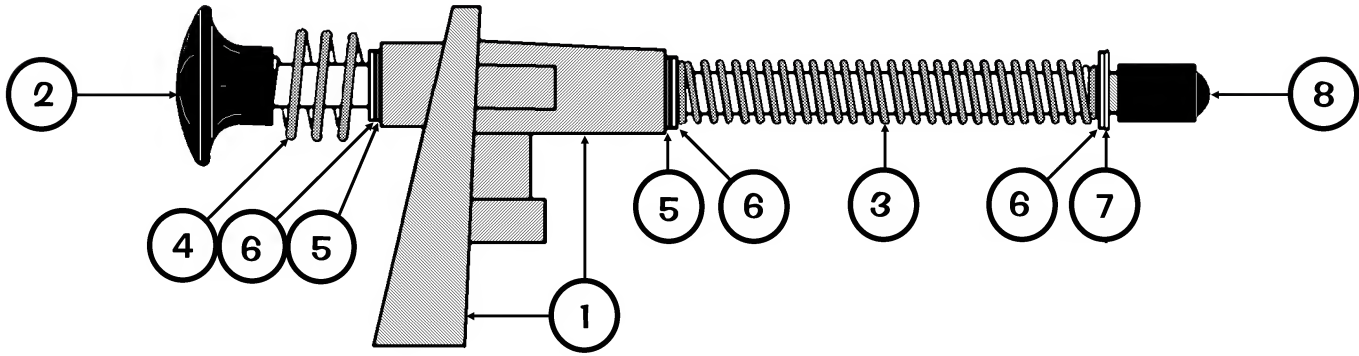
Drawings are provided for the Major Assemblies in this game with individual parts of each assembly numbered. Items noted with a white circle ○ are mounted above the playfield; items noted with a black circle ● are mounted below. All numbered parts describe the **NAME, QUANTITY & PART N°**. **ASSOCIATED PARTS (AP-)** are noted and/or viewed with the associated Major Assembly. **Important:** Read all "Take Note:" items.



Sec. 4: Drawings ...

Ball Shooter (Plunger) Assembly, 500-6146-00-04 (Items 1-8)

Manually launch the ball into play.



Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Housing (Shooter Assembly)	1	535-5067-02	4	Compression Spring (Short Plunger)	1	266-5010-00
Item 1 is secured to the Cabinet by: Support Plate (Qty. 1) (535-5027-00), #10-32 X 1/2" PPH (Sems) Zinc TF (Qty. 3) (237-6033-00), #10 Split Lock Washer (Qty. 3) (234-5003-00) and #6 X 5/8" HWH AB (Zinc) (Qty. 2) (234-5002-00)				5	Bushing, 3/8" I.D. (Oilite)	2	280-5010-00
2	Rod Assembly (w/Black Knob)	1	515-6557-00	6	Washer, 3/8" I.D. X 5/8" O.D. X 1/16"	3	242-5014-00
3	Comp. (Return) Spring (GRN, .035" ø)	1	266-5001-04	7	Retaining Ring, 3/8" ø Shaft	1	270-5012-00
				8	Plunger Tip (Black 50 Duro)	1	545-5276-00

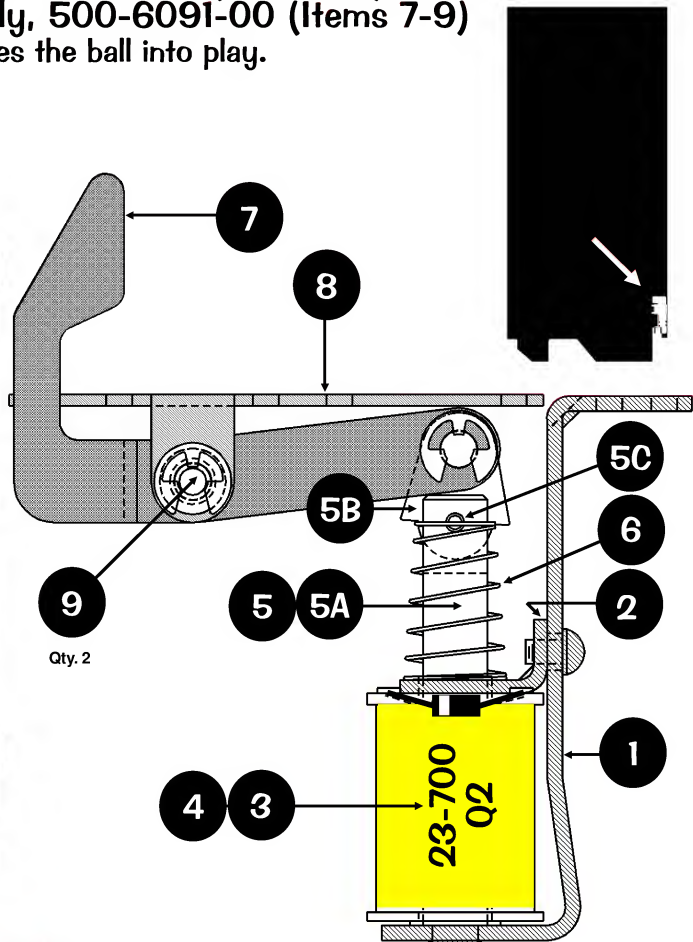
Autoplunger Coil Assembly, 500-6092-05 (Items 1-6) with Autoplunger Arm Weld Assembly, 500-6091-00 (Items 7-9)

Automatically launches the ball into play.

Sec. 4: Drawings ...

Nº	'PLUNGER COIL PART NAME	QTY.	SPI PART Nº
1	Autoplunger Coil Bracket Assembly	1	515-6527-00
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 9) (234-5101-00)			
2	Coil Retainer Bracket	1	535-5203-03
Item 2 is secured to Item 1 by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5300-00)			
3	Coil, 23-700	1	090-5022-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
4	Coil Sleeve	1	545-5031-00
5	Plunger & Link Assembly	1	515-5338-00
ORDERING ABOVE (ITEM 5) SUB-ASSY. PART Nº WILL INCLUDE:			
5A	Plunger 2"	1	530-5025-01
5B	Plunger Link	1	545-5293-00
5C	Roll Pin, 1/8" ø X 5/8" Lg.	1	251-5008-00
Item 5B is secured to Item 7 by: Retaining Ring, 1/4" ø Shaft (Qty. 1) (270-5002-00)			
Ordering Note: If 515-5338-00 is unavailable, order the individual part(s) actually required.			
6	Compression (Return) Spring	1	266-5020-00

Nº	... ARM WELD PART NAME	QTY.	SPI PART Nº
7	Arm Weld Assembly	1	515-6526-00
Item 7 is secured to Item 8 by: Retaining Ring, 1/4" ø Shaft (Qty. 1) (270-5002-00)			
8	Autoplunger Fulcrum	1	535-7697-00
9	Nyliner, 1/4" (Thomson #411-FF)	2	545-5423-00



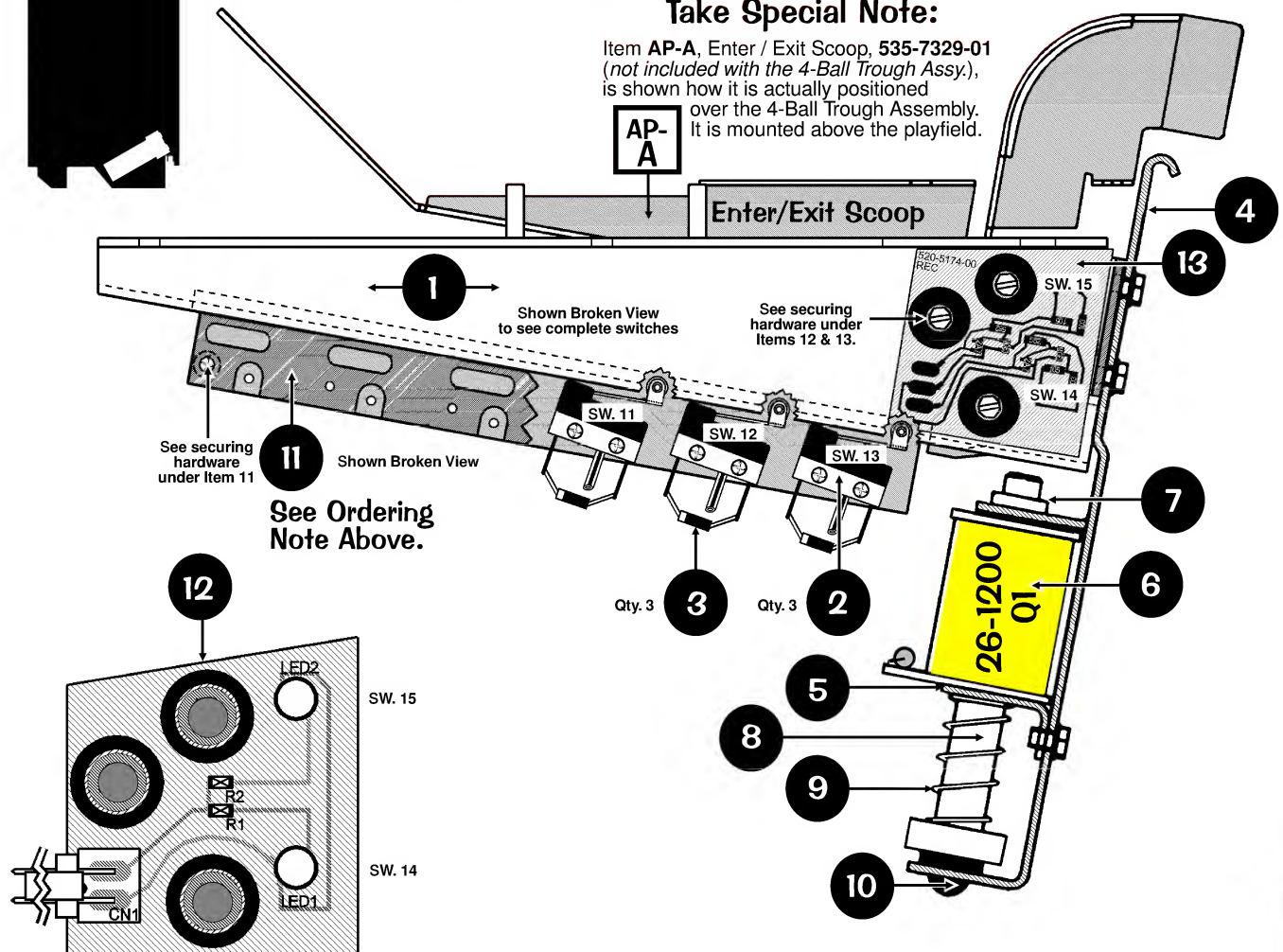
4-Ball Trough Assembly, 500-6318-24 (Items 1-13)

and Associated Parts: See Parts Table below.

Ordering Note: Identical to 500-6318-14 except it does require Item 11, Trough Ball Guide Plate (used only when magnets are present in the game).

Take Special Note:

Item **AP-A**, Enter / Exit Scoop, 535-7329-01 (not included with the 4-Ball Trough Assy.), is shown how it is actually positioned over the 4-Ball Trough Assembly. It is mounted above the playfield.



Item 12, Dual OPTO TRANS (Transmitter) Board, 515-0173-00, is mounted on the other side of the Trough Assembly, in line with Item 13, Dual OPTO REC (Receiver) Board, 515-0174-00, using same hardware.

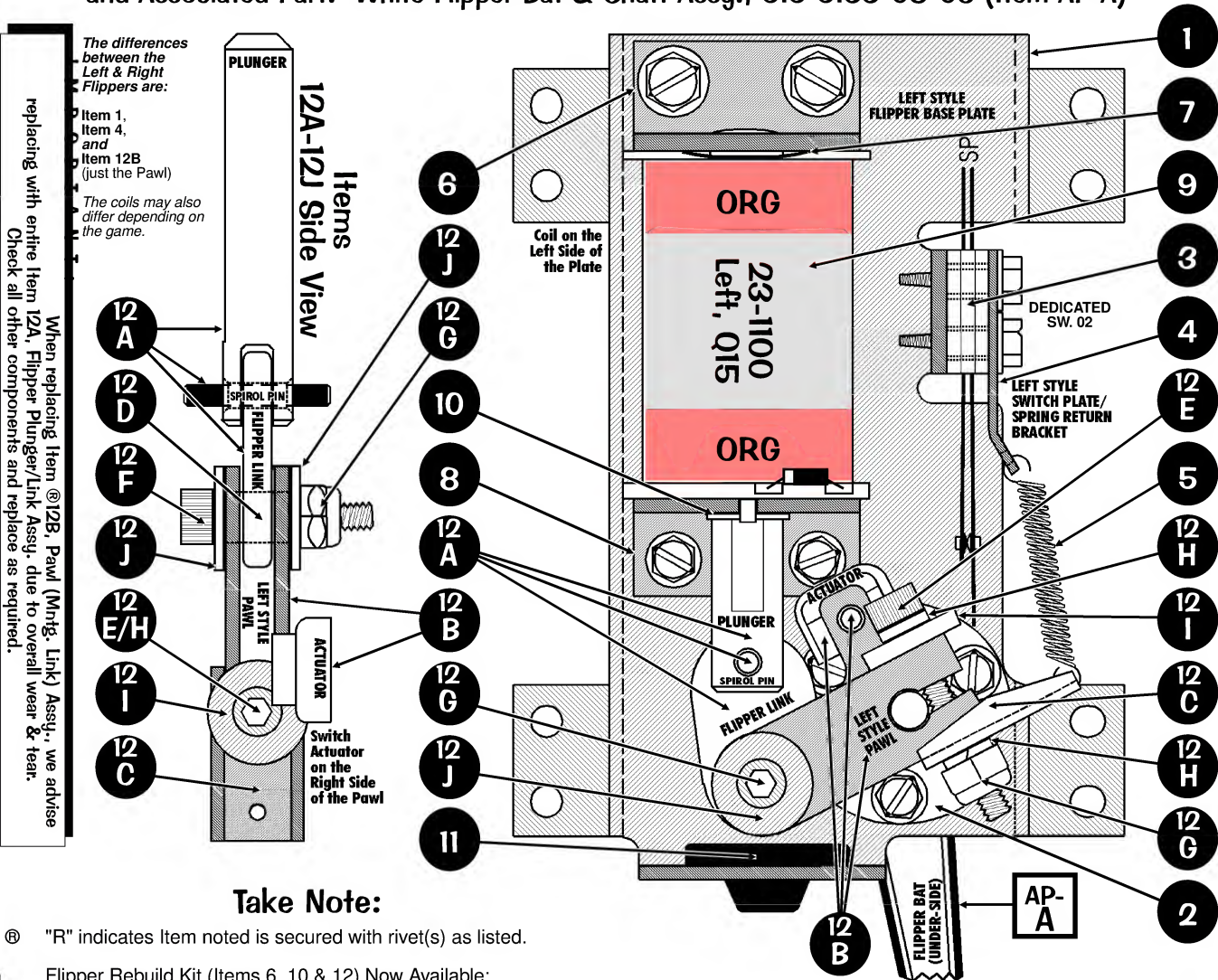
Take Note:

* An asterisk (*) indicates item(s) are not noted in the pictorials.

For a break-down of parts of Items 12 & 13, OPTO Boards (515-0173-00 & 515-0174-00), see Section 5, Chapter 4, *Trough Up-Kicker Dual OPTO Boards Theory of Operation & Schematic, Component Layout & Parts*.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Ball Trough Outhole Mounting Bracket	1	515-6580-01	10	Rubber Bumper (Grommet)	1	545-5105-00
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 6) (234-5101-00)				11	Trough Ball Guide Plate	1	535-7801-00
2	Micro Switch (Roller Actuator, Lite-Force)	3	180-5119-02	Item 11 is secured to Item 1 by: 1/4" X 5/16" X .144" I.D. Spacer Tap. (Qty. 1) (254-5014-03) and #2-56 X 1/2" HWH (Ser) UNS #4HD TR3 BO (Qty. 4) (237-5937-02)			
Item 2 is secured to Item 1 by: #2-56 X 1/2" HWH (Sr) UNS #4HD TR3 BO (Qty. 6) (237-5937-02)				12	Dual OPTO TRANS Board Assembly	1	515-0173-00
Item 2 requires: Heat Shrink Tubing 1/8" ø PUI-24 (Qty. 1"/per) (605-5006-00)				13	Dual OPTO REC Board Assembly	1	515-0174-00
3	Switch Diode, 1N4001	3	112-5001-00	Items 12 & 13 are by: #6-32 X 5/8" HWH Swage (Serr) Zinc (Qty. 3/per) (237-5976-04)			
4	Coil Mounting Bracket	1	535-7330-01	For Individual Items use: Dual OPTO TRANS Bd. (Qty. 1) (520-5173-00), Dual OPTO REC Bd. (Qty. 1) (520-5174-00), OPTO PCB Tube Spacer (Brass) (Qty. 3/per) (530-5308-02) or OPTO PCB Rubber Grommet (Qty. 3/per) (545-5518-00)			
Item 4 is secured to Item 1 by: #8-32 X 3/8" HWH Swage (Sr.) Zinc (Qty. 4) (237-5975-00)				ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.			
5	Coil Retaining Bracket	1	535-5203-03	Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
Item 5 is secured to Item 4 by: #8-32 X 1/4" HWH MS (Serr) Zinc (Qty. 2) (237-5964-01)				AP-A	Ball Trough Enter / Exit Scoop	1	535-7329-01
6	Coil, 26-1200	1	090-5044-00T	Item AP-A secured to the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00).			
ORDERING ABOVE (ITEM 6) COIL PART Nº WILL INCLUDE:				AP-B*	Steel Balls (1-1/16" ø)	4	260-5000-00
—	Diode, 1N4004 (positioned at top)	1	112-5003-00				
7	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01				
8	Plunger Assembly	1	515-5941-01				
9	Compression (Return) Spring	1	266-5020-00				

Flipper (Left) Assembly, 500-5944-14 (Items 1-12)
and Associated Part: White Flipper Bat & Shaft Assy., 515-5133-08-06 (Item AP-A)



Sec. 4: Drawings ...

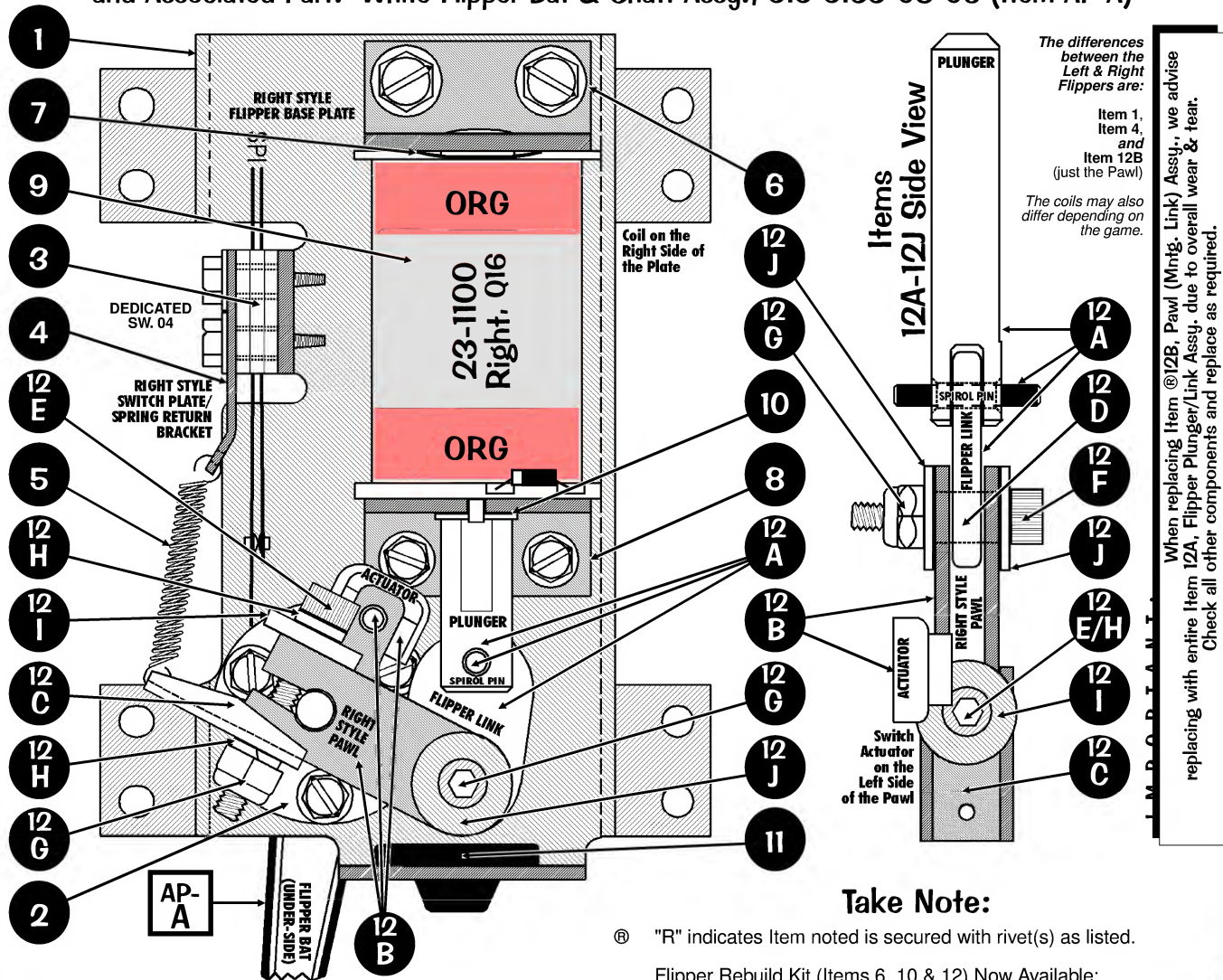
Flipper Rebuild Kit (Items 6, 10 & 12) Now Available:
Flipper (Left) Rebuild Kit: 500-6307-10

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Flipper Base Plate Kit (Left)	1	515-6617-01
ORDERING ABOVE (ITEM 1) KIT (LEFT) PART Nº WILL INCLUDE:			
Note: Flipper Base Plate (Left) comes threaded with all securing hardware (Thread Forming Screws) as listed under each of the Items which will get secured to it (Items 2, 3, 6 & 8).			
Item 1 is secured below the playfield by: #10 X 1/2" HWH MS (Serr) Zinc ST (Qty. 8) (237-5949-00)			
2	Flipper Bat Bushing	1	545-5594-00
Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)			
3	Power (End of Stroke) Switch	1	180-5149-00
Item 3 is secured to Item 1 by: #6-32 X 5/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-04)			
4	Switch Plate/Spring Return Lt. Brkt.	1	535-7354-01
5	Flipper Return Spring	1	265-5035-00
6	Coil Stop Bracket Sub-Assembly	1	515-6308-01
Item 6 is secured to Item 1 by: #10-32 X 3/8" SHWH Swage (Serr) Zinc (Qty. 2) (237-5985-00) and #10 Split Lock Washer (Qty. 2) (244-5003-00)			
7	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
8	Coil Support Bracket	1	535-7356-00
Item 8 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)			
9	Coil, 23-1100 (ORANGE) (Left)	1	090-5030-00T
ORDERING ABOVE (ITEM 9) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
10	Coil Sleeve	1	545-5388-00
11	Deflector Pad (Bumper)	1	545-5428-00

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
12	Plunger, Link & Pawl (Left) Sub-Assy.	1	515-6518-01
ORDERING ABOVE (ITEM 12) SUB-ASSY. PART Nº WILL INCLUDE:			
12A	Flipper Plunger/Link Sub-Assy.	1	515-6304-01
includes: Plunger "Flipper" Link 1 545-5611-00			
includes: Spirol Pin ø 5/32" X 3/4" Lg. 1 251-5015-02			
includes: Flipper Plunger with "Flat" 1 530-5349-01			
12B	Pawl (Mntg. Link) (Left) Sub-Assy.	1	515-6305-01
includes: Pawl (Mounting Link) (Left) Plain 1 535-7271-01			
includes: @ Switch Actuator 1 545-5612-00			
includes: Rivet, 1/8" ø X 1/4" Lg. 1 249-5003-00			
12C	Return Bracket	1	535-7353-00
12D	Flipper Link Bushing (Metal, Ext.) (.385" Lg. X .192" ID X .312" OD)	1	530-5139-01
12E	#10-32 X 1-1/4" Lg. Socket Head	1	237-5950-01
12F	#10-32 X 7/8" Lg. Socket Head	1	237-5966-00
12G	#10-32 Nylon Stop Nut	2	240-5203-00
12H	#10 Split Lock Washer	2	244-5003-00
12I	Washer .203" ID X .63" OD X .105" Thk W/Cut	1	242-5039-01
12J	Washer .203" ID X .63" OD X .062" Thk	2	242-5038-00
SAVE MONEY! and order the FLIPPER (LT) REBUILD KIT now AVAILABLE: >>> Includes Items 6, 10 & 12 Ask your Distributor >>> for Part Number 500-6307-10 (for the LEFT) ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.			
Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
AP-A	WHITE Flipper Bat & Shaft (Plain) (Non-Knurled End) Assembly	1	515-5133-08-06
	Large Flipper BLACK Rubber Ring	1	545-5277-00



Flipper (Right) Assembly, 500-5944-04 (Items 1-12)
and Associated Part: White Flipper Bat & Shaft Assy., 515-5133-08-06 (Item AP-A)



Take Note:

® "R" indicates Item noted is secured with rivet(s) as listed.

Flipper Rebuild Kit (Items 6, 10 & 12) Now Available:
Flipper (Right) Rebuild Kit: 500-6307-00

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Flipper Base Plate Kit (Right)	1	515-6617-00
ORDERING ABOVE (ITEM 1) KIT (RIGHT) PART Nº WILL INCLUDE:			
Note: Flipper Base Plate (Right) comes threaded with all securing hardware (Thread Forming Screws) as listed under each of the Items which will get secured to it (Items 2, 3, 6 & 8).			
Item 1 is secured below the playfield by: #10 X 1/2" HWH MS (Serr) Zinc ST (Qty. 8) (237-5949-00)			
2	Flipper Bat Bushing	1	545-5594-00
Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)			
3	Power (End of Stroke) Switch	1	180-5149-00
Item 3 is secured to Item 1 by: #6-32 X 5/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-04)			
4	Switch Plate/Spring Return Rt. Brkt.	1	535-7354-00
5	Flipper Return Spring	1	265-5035-00
6	Coil Stop Bracket Sub-Assembly	1	515-6308-01
Item 6 is secured to Item 1 by: #10-32 X 3/8" SHWH Swage (Serr) Zinc (Qty. 2) (237-5985-00) and #10 Split Lock Washer (Qty. 2) (244-5003-00)			
7	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
8	Coil Support Bracket	1	535-7356-00
Item 8 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)			
9	Coil, 23-1100 (ORANGE) (Right)	1	090-5030-00T
ORDERING ABOVE (ITEM 9) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
10	Coil Sleeve	1	545-5388-00
11	Deflector Pad (Bumper)	1	545-5428-00

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
12	Plunger, Link & Pawl (Rt.) Sub-Assy.	1	515-6518-00
ORDERING ABOVE (ITEM 12) SUB-ASSY. PART Nº WILL INCLUDE:			
12A	Flipper Plunger/Link Sub-Assy.	1	515-6304-01
includes: Plunger "Flipper" Link 1 545-5611-00			
includes: Spirol Pin ø 5/32" X 3/4" Lg. 1 251-5015-02			
includes: Flipper Plunger with "Flat" 1 530-5349-01			
@12B	Pawl (Mntg. Link) (Rt.) Sub-Assy.	1	515-6305-00
includes: Pawl (Mounting Link) (Rt.) Plain 1 535-7271-00			
includes: @ Switch Actuator 1 545-5612-00			
includes: Rivet, 1/8" ø X 1/4" Lg. 1 249-5003-00			
12C	Return Bracket	1	535-7353-00
12D	Flipper Link Bushing (Metal, Ext.) (385" Lg. X .192" ID X .312" OD)	1	530-5139-01
12E	#10-32 X 1-1/4" Lg. Socket Head	1	237-5950-01
12F	#10-32 X 7/8" Lg. Socket Head	1	237-5966-00
12G	#10-32 Nylon Stop Nut	2	240-5203-00
12H	#10 Split Lock Washer	2	244-5003-00
12I	Washer .203" ID X .63" OD X .105" Thk W/Cut	1	242-5039-01
12J	Washer .203" ID X .63" OD X .062" Thk	2	242-5038-00

SAVE MONEY! and order the
FLIPPER (RT) REBUILD KIT now AVAILABLE:
>>> Includes Items 6, 10 & 12 Ask your Distributor
>>> or Part Number **500-6307-00** (for the RIGHT)
ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.

Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
AP-A	WHITE Flipper Bat & Shaft (Plain) (Non-Knurled End) Assembly	1	515-5133-08-06
	Large Flipper BLACK Rubber Ring	1	545-5277-00

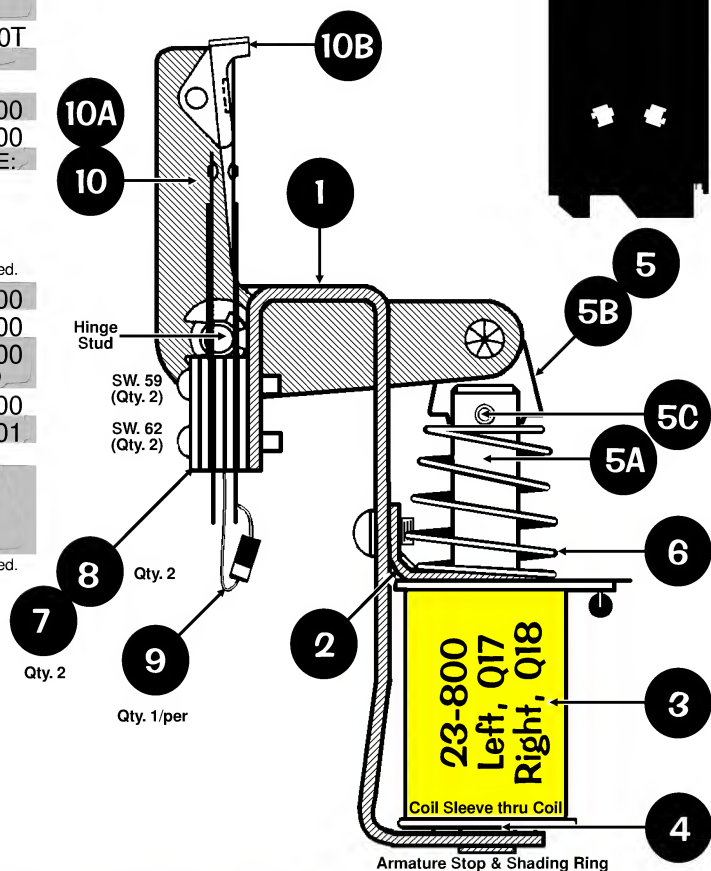
Slingshot Assemblies, 500-5849-00 (Qty. 2) (Items 1-10)

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Slingshot Bracket Assembly	1	515-5339-01
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 3) (234-5101-00)			
2	Coil Retaining Bracket	1	535-5203-03
Item 2 is secured to Item 1 by: #8-32 X 3/8" PPH MS (Sems) (Qty. 2) (232-5301-00)			
3	Coil, 23-800	1	090-5001-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
4	Coil Sleeve	1	545-5031-00
5	Plunger & Link Assembly	1	515-5338-00
ORDERING ABOVE (ITEM 5) SUB-ASSY. PART Nº WILL INCLUDE:			
5A	Plunger 2" Lg.	1	530-5025-01
5B	Plunger Link	1	545-5293-00
5C	Roll Pin 1/8" ø x 5/8" Lg.	1	251-5008-00
Item 5B is secured to Item 10A by: Retaining Ring, 1/4" ø Shaft (Qty. 1) (270-5002-00)			
Ordering Note: If 515-5338-00 is unavailable, order the individual part(s) actually required.			
6	Compression (Return) Spring	1	266-5020-00
7	Slingshot Stack (Blade) Switch	2	180-5054-00
8	Switch Body Protect Plate	2	535-5045-00
Items 7 & 8 are secured to Item 1 by: #6-32 X 5/8" HWH Swage (Qty. 4) (237-5976-04)			
9	Switch Diode, 1N4001	2	112-5001-00
10®	Riveted Arm & Tip Assembly	1	515-5340-01
ORDERING ABOVE ® RIVETED ASSY. PART Nº WILL INCLUDE:			
10A	Arm	1	515-5341-01
10B®	Kicker Tip (secured to 1A by 1C)	1	545-5216-01
10C*	Rivet, 1/8" ø x 1/4" Lg.	1	249-5003-00
Item 10A is secured to Item 1 by: Retaining Ring, 1/4" ø Shaft (Qty. 1) (270-5002-00)			
Ordering Note: If 515-5340-01 is unavailable, order the individual part(s) actually required.			

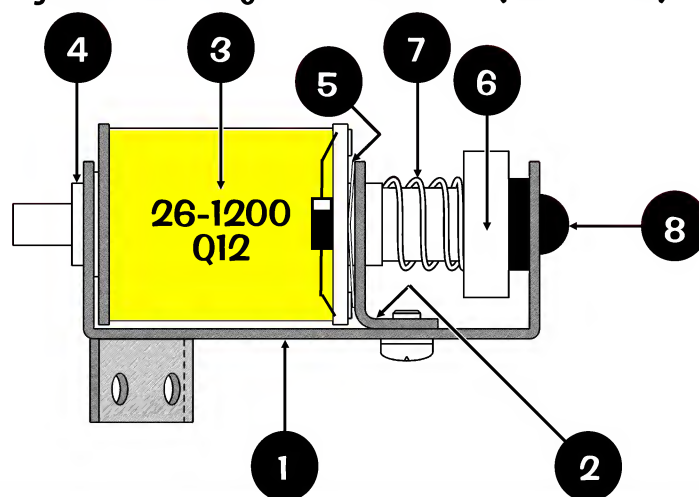
Take Note:

* An asterisk (*) indicates item(s) are not noted in the pictorials.

® "R" indicates Item noted is secured with rivet(s) as listed.



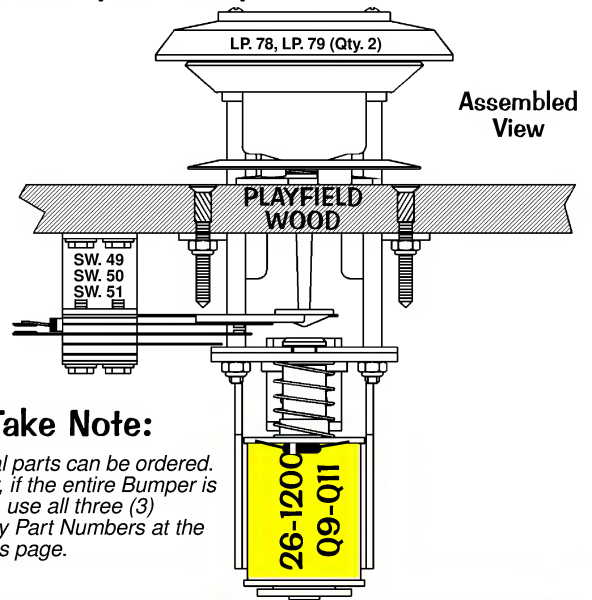
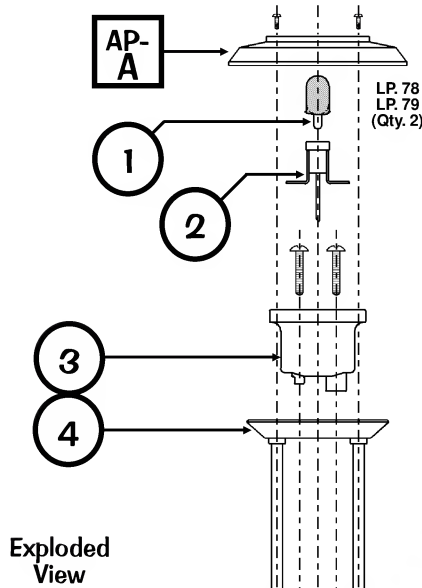
30° Eject Assembly, 500-6511-01 (Items 1-8)



Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Mounting Bracket 30° Bend (Frame)	1	535-8932-00	4	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 2) (234-5101-00)				5	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
2	Coil Retaining Bracket	1	535-5203-03	6	Plunger Assembly	1	515-7197-00
Item 2 is secured to Item 1 by: #8-32 X 1/4" PPH MS (Sems) (Qty. 2) (232-5300-00)				7	Compression (Return) Spring	1	266-5020-00
3	Coil, 26-1200	1	090-5044-00T	8	Rubber Bumper (Grommet)	1	545-5105-00
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:				Ordering Note: If 500-6511-01 is unavailable, order the individual part(s) actually required or try -00 and change the coil to 26-1200 (090-5044-00T).			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00				

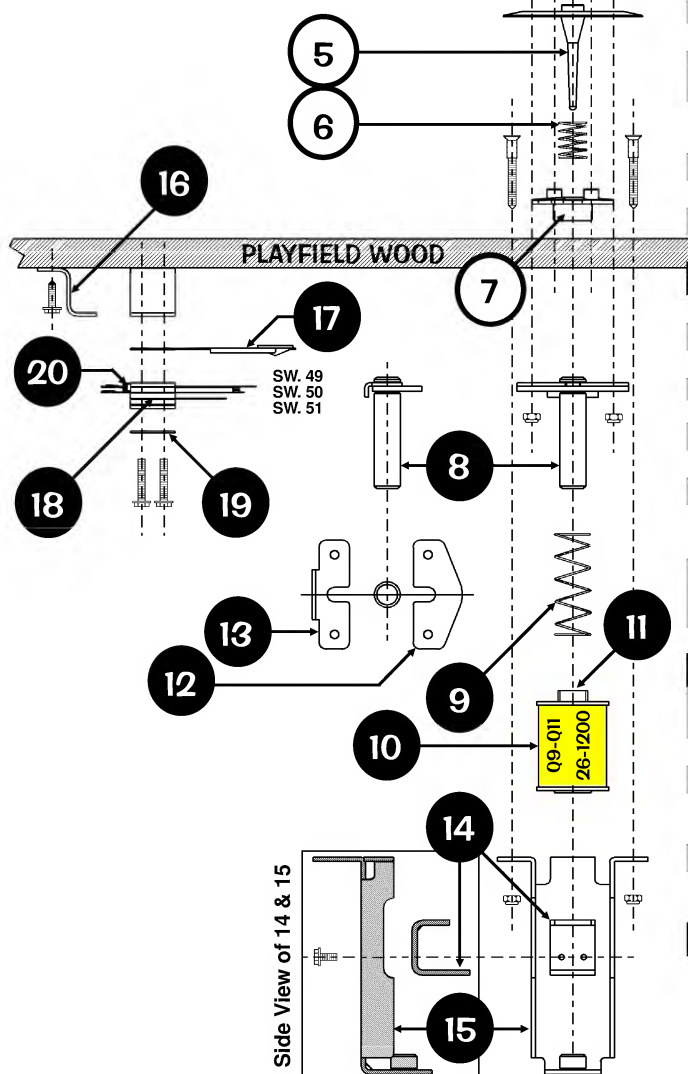


**Bumper Top Assemblies, 515-6459-01 (Qty. 3) (Items 1-7),
Bumper Bottom Assemblies, 515-6459-04 (Qty. 3) (Items 8-15),
Bumper Switch Assemblies, 515-6459-03 (Qty. 3) (Items 16-20)
and Associated Part(s): See Table Below (Item AP-A)**



Take Note:

*Individual parts can be ordered.
However, if the entire Bumper is
required, use all three (3)
Assembly Part Numbers at the
top of this page.*



Nº	BUMPER TOP PART NAME	QTY.	SPI PART Nº
1	#555 Wedge Base Bulb	1	165-5002-00
2	#555 Wedge Base Socket	1	077-5206-00
3	Bumper Body	1	545-5197-00
Item 3 is secured by: #5 X 7/8" PRH AB (Zinc) (Qty. 2) (237-5826-00)			
4	Ring Assembly	1	515-5085-00
Item 4 is secured by: #6-32 Nylon Stop Nut (Qty. 2) (240-5005-00)			
5	Bumper Skirt	1	545-5607-00
6	Bumper Skirt Compression Spring	1	266-5048-00
7	Bumper Base	1	545-5195-00

Nº	BUMPER BOTTOM PART NAME	QTY.	SPI PART Nº
8	Plunger	1	530-5348-00
9	Compression (Return) Spring	1	266-5047-00
10	Coil, 26-1200	1	090-5044-00T
ORDERING ABOVE (ITEM 10) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
11	Coil Sleeve	1	545-5031-00
12	Fiber Yoke	1	545-5609-00
13	Metal Yoke	1	535-7346-00
14	Metal Yoke Stop	1	535-7347-00
Item 14 is secured by: #6-32 X 1/4" HWH Swage (Serr.) Zinc (Qty. 2) (237-5976-01)			
15	Coil Bracket Welded Assembly	1	515-5939-00
Item 15 is secured by: #6-32 X 1-3/16" Spiral Fin Shank (Qty. 3) (237-5957-00) and #6-32 Nylon Stop Nut (Qty. 3) (240-5005-00)			

Nº	BUMPER SWITCH PART NAME	QTY.	SPI PART Nº
16	Switch Bracket	1	535-7342-00
Item 16 is secured by: #8 X 1/2" SHWH AB (Zinc) (Qty. 2) (234-5101-00)			
17	Spoon Switch Actuator	1	545-5610-01
18	Bumper Stack (Blade) Switch	1	180-5015-03
19	Switch Body Protect Plate	1	535-7344-00
Items 18 & 19 are secured by: #6-32 X 3/4" HWH Swage (Serr.) Zc. (Qty. 2) (237-5976-05)			
20	Switch Diode, 1N4001	1	112-5001-00

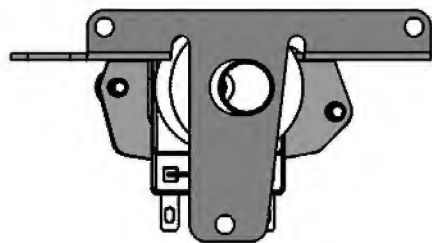
The Top & Bottom Assemblies are secured together by hardware included in assemblies.

ASSOCIATED PART IS NOT INCLUDED WITH THE ABOVE ASSEMBLY.

Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
AP-A	Bumper Cap (Red)	3	550-5057-02
Item AP-A is secured to Item 4 by: #4 X 3/4" PRH (Zinc) T-25 (Qty. 2/per) (237-5873-00)			

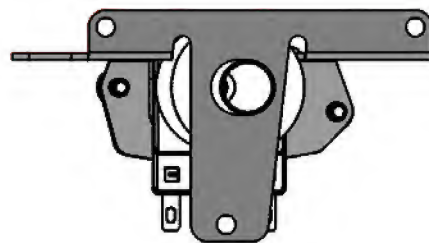
Bead Curtain Bottom Left (515-7216-00) & Right (515-7216-01) Assy. (Items 1-5)
Not sold as an assembly, order the individual part(s) actually required.

Top View Left -00



This Assembly works in conjunction with the Bead Curtain Top Assembly (Next Page).

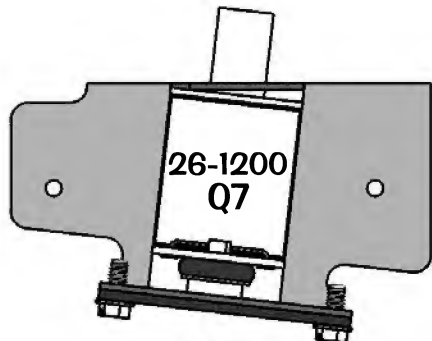
Top View Right -01



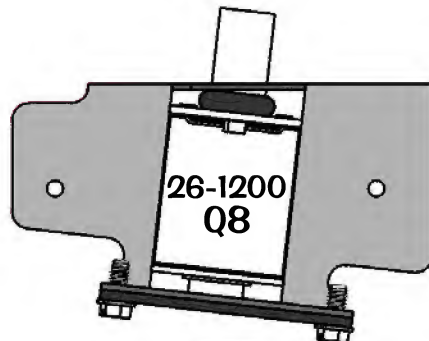
Take Note:

The **only** difference between these 2 assemblies is **how the coil is mounted (180° Rotated)**. Note the Position of the Coil Lugs in the Side & 3D Views.

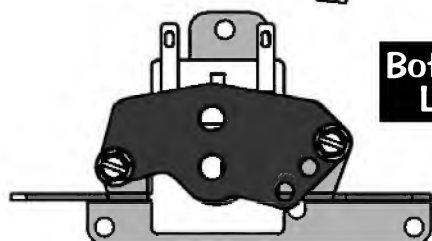
Side View Left -00



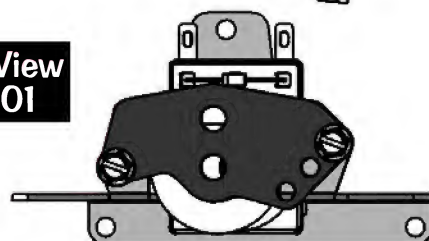
Side View Right -01



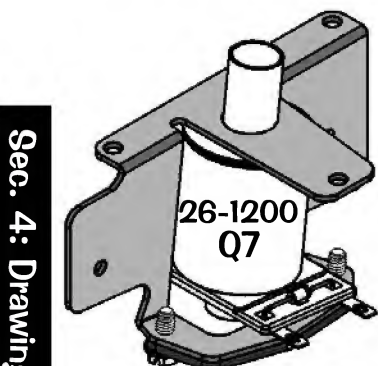
Bottom View Left -00



Bottom View Right -01

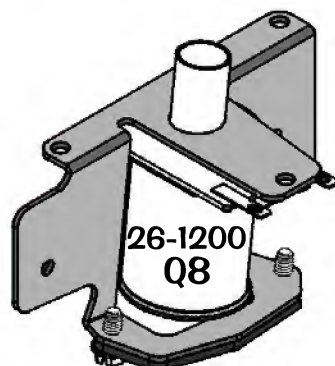
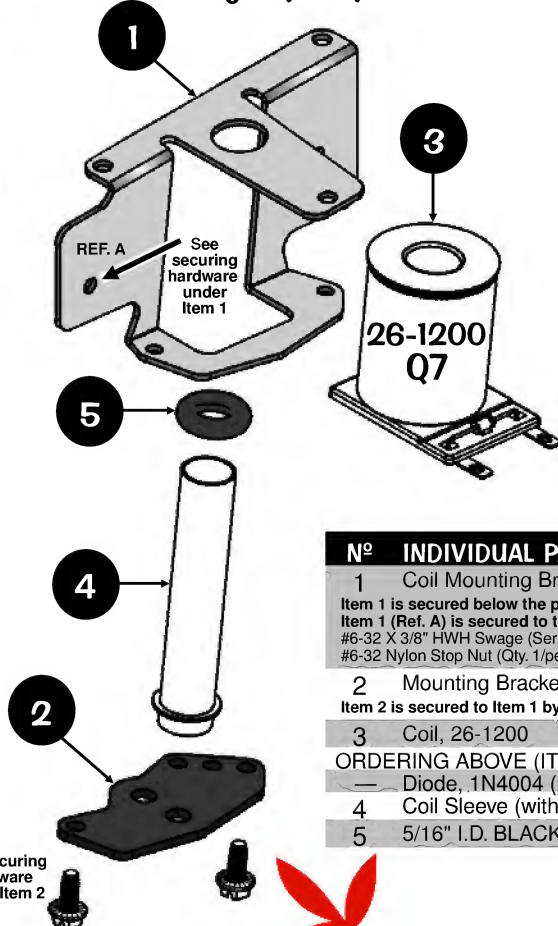


Exploded View Left Style (-00) Shown



3D View Left -00

Sec. 4: Drawings ...



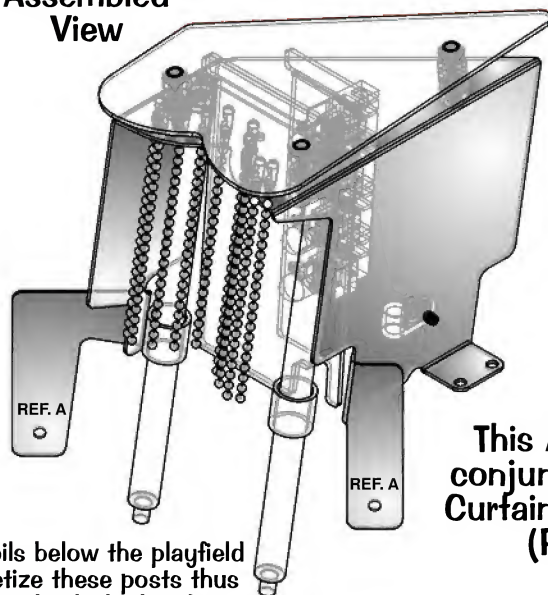
3D View Right -01

Nº	INDIVIDUAL PART NAME	QTY.	9PI PART Nº
1	Coil Mounting Bracket	2	535-9048-00
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zc) (Qty. 3/per) (234-5101-00)			
Item 1 (Ref. A) is secured to the Bead Curtain Frame (Item 1, Next Page) by:			
#6-32 X 3/8" HWH Swage (Ser) Zinc (Qty. 1/per: 1 side only) (237-5976-02) and			
#6-32 Nylon Stop Nut (Qty. 1/per: 1 side only) (240-5005-00)			
2	Mounting Bracket	2	535-9049-00
Item 2 is secured to Item 1 by: #8-32 X 3/8" HWH MS (Zinc) (Qty. 2/per) (237-5903-00)			
3	Coil, 26-1200	2	090-5044-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1/per	112-5003-00
4	Coil Sleeve (with extension)	2	545-5847-00
5	5/16" I.D. BLACK Rubber Ring	2	545-5348-02



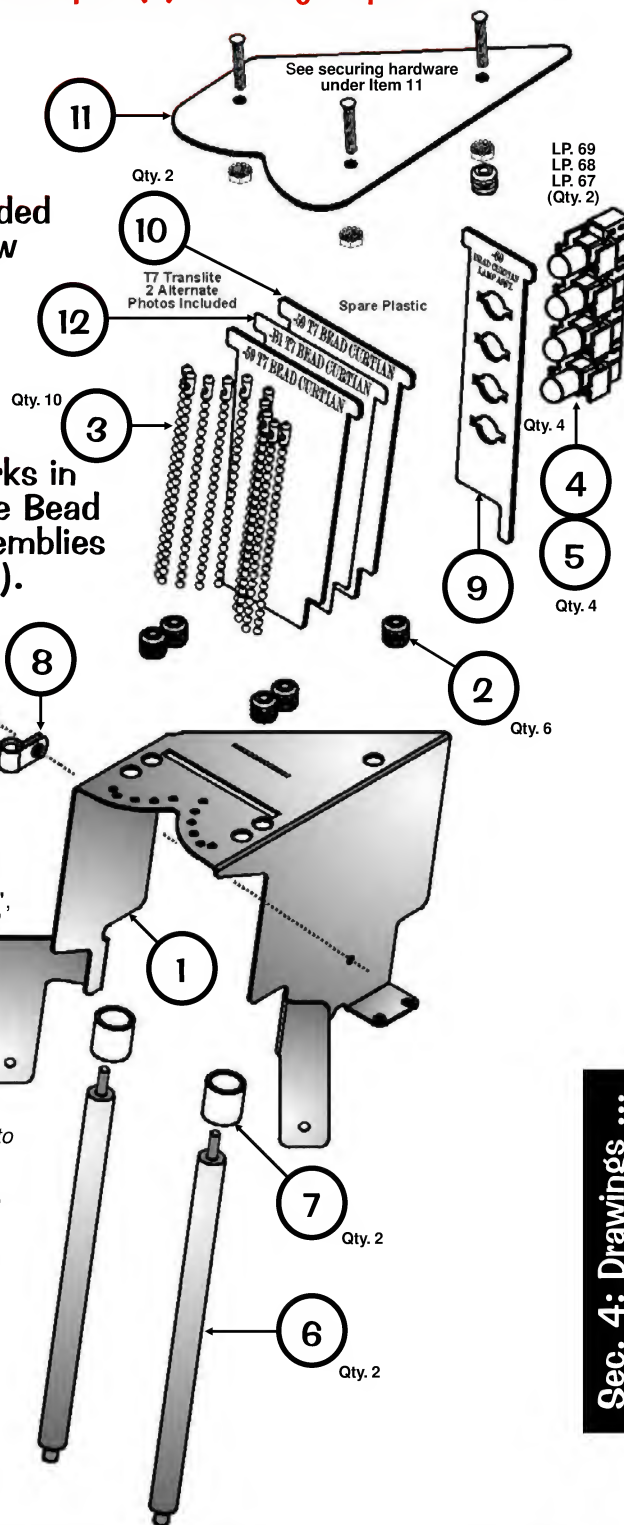
Bead Curtain Top Assembly (515-7215-00) (Items 1-12)
Not sold as an assembly, order the individual part(s) actually required.

Assembled View



The Coils below the playfield magnetize these posts thus pulling back the beads.

Exploded View



This Assembly works in conjunction with the Bead Curtain Bottom Assemblies (Previous Page).



T7's



Pull up the Plastic Cover straight up and set aside. Replace the Photo Insert behind the hanging Plastic & place the cover back on.

Please Note: 1 Spare Clear Plastic (830-5989-59 T7) is provided in the Spare Parts Bag.

Availability Note:

This game is supplied with 3 Set of Photo Inserts. **A: "No Nudity"**, **B: "Nudity Factory Suggested"** and **C: "Some Full Nudity"**. 1 Set was installed at the Factory and the other 2 Sets are packed with the game. **Read the Instruction Sheet (756-5009-00)** which is provided with the Photo Insert Kit inside this game. For the same 3 Sets, order Kit **502-5010-00**, no other style Photo Inserts are available.

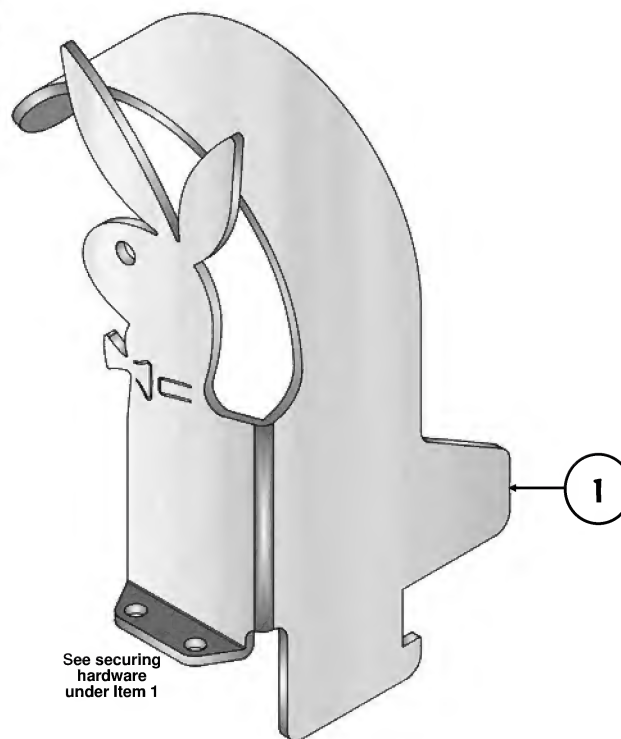
Items 9-12: Plastics and Photo Inserts, are not available individually. The entire Set(s) and/or Kit(s) must be ordered. See Section 4, Chapter 1, Page 63 for Plastics & Decals.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Bead Curtain Frame	1	535-9047-00
Item 1 is secured above the playfield by: #8 X 1/2" HWH AB (Zc) (Qty. 2) (234-5101-00)			
Item 1 (Ref. A) is secured to the Coil Mounting Brackets (Item 1, Previous Page) by:			
#6-32 X 3/8" HWH Swage (Ser) Zinc) (Qty. 1/per: 1 side only) (237-5976-02) and			
#6-32 Nylon Stop Nut (Qty. 1/per: 1 side only) (240-5005-00)			
2	Rubber Grommet (Double-Edge)	6	280-5015-00
3	Ball (Bead) Chain, 4" Brass (#6 4PBS)	10	880-5056-00
4	#555 IDC Snap-On Socket	4	077-5216-00
5	#555 Wedge Base Bulb (Clear)	4	165-5002-00
6	Post (Magnetized with Coils)	2	530-5603-01
7	Nylon Post Sleeve	2	545-6028-16
8	1/4" Clamp (Double)	1	040-5000-23
Item 8 is secured to Item 1 by: #8-32 X 3/8" HWH MS Type C (Qty. 1) (237-5903-00) and			
#8 Washer (Qty. 1) (242-5005-00)			

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
9	Clear Plastic -60 (Light Board)	1	from 830-5989-XX
10	Clear Plastic -59 T7	2	from 830-5989-XX
11	Screened Plastic -23	1	from 830-5988-XX
Item 11 is secured into Item 2 on Item 1 by: #8-32 X 1" Pem Self-Clinching Stud (Qty. 3) (237-5867-16), #8-32 Keps Nut (Qty. 3) (240-5104-00) and Item 2 (Qty. 1) at rear.			
12	Photo Insert -T7 (3 Styles A, B & C)	1	from 502-5010-00
Items 9-12: READ "Availability Note" above on ordering availability.			

Exit Scoop (Playboy Rabbit Head), 535-9097-01 (Item 1) Guides ball from VUK into the Right Wire Ramp.

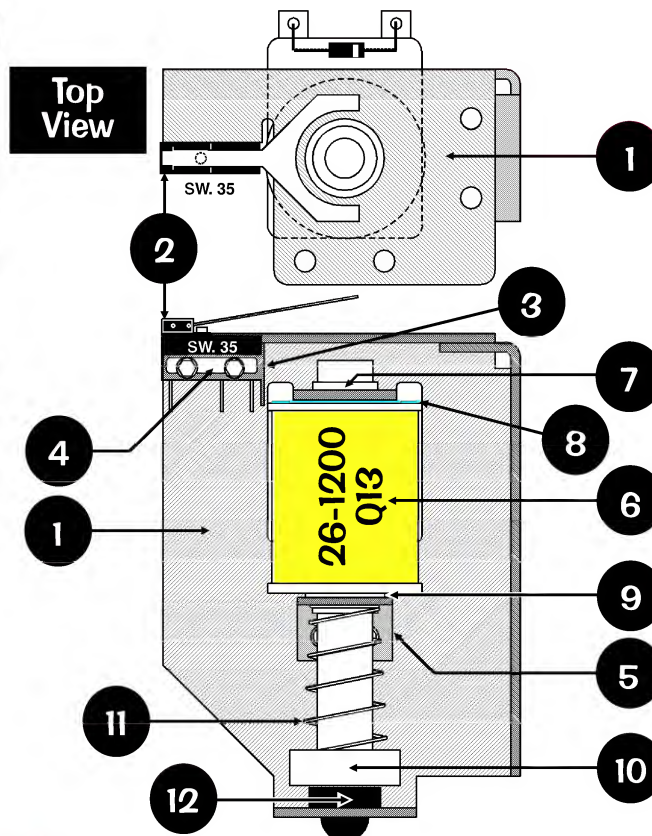
Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Exit Scoop (Playboy Rabbit Head)	1	535-9097-01
Item 1 is secured above the playfield by: #8-32 X 1" HWH (Zinc) (Qty. 2) (237-6003-00) For view of this screw, see identical part used on the 1-Bank Drop Target, Item 20.			



VUK (Vertical Up-Kicker, Left Style) Assembly, 500-6290-00 (Items 1-12) Ball launches into the scoop above onto the Right Wire Ramp.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	VUK Coil Mounting Bracket (Left Style)	1	535-8296-00
Item 1 is secured under the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 3) (234-5101-00)			
2	Micro Sw. (Heavy Duty "Y" Flat Actuator)	1	180-5116-01
3	Switch Lug Insulator (Fiche Paper)	1	545-5759-00
4	Switch Body Protect Plate	1	535-6539-00
Items 2-4 are secured by: #2-56 X 1/2" HWH MS (Serr) Zc TF 3/16" (Qty. 2) (237-5937-02)			
5	Coil Retaining Bracket	1	535-5203-03
Item 5 is secured by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5300-00)			
6	Coil, 26-1200	1	090-5044-00T
ORDERING ABOVE (ITEM 6) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
7	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01
8	Coil Lug Insulator (Fiche Paper)	1	545-5431-00
9	Spring Washer, 17/32" ID X 3/4" X 1"	1	269-5002-00
10	Plunger Assembly	1	515-5941-01
11	Compression (Relay) Spring	1	266-5020-00
12	Rubber Bumper (Grommet)	1	545-5105-00

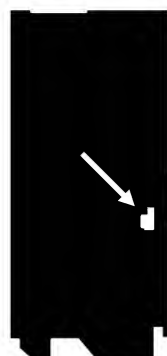
Sec. 4: Drawings ...



Take Note:

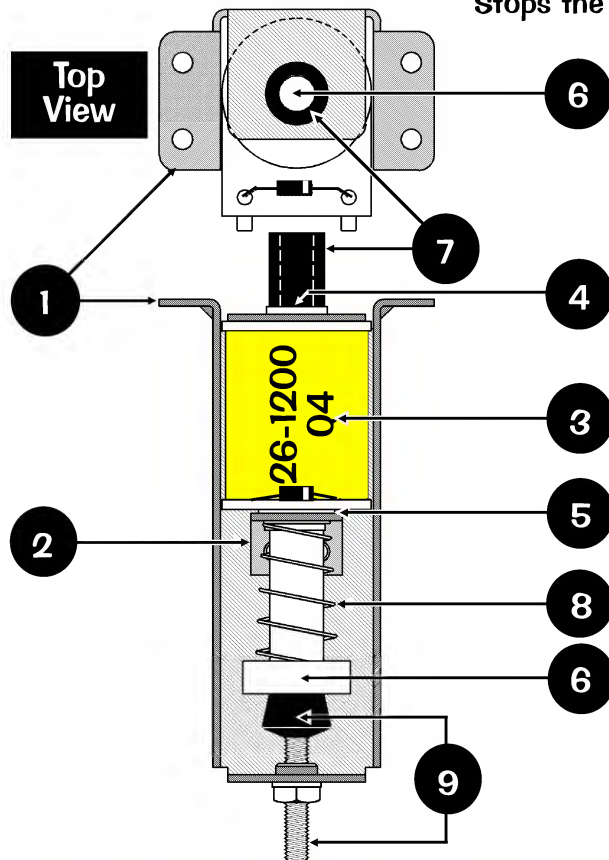
* An asterisk (*) indicates item is *Not Shown* in pictorial.

The Switch Diode, 1N4001, is not located on this assembly (nor included); it's located on a *Terminal Strip* under the playfield. See *Section 5, Chapter 2, Playfield Terminal Strips...*, **Page 101**.



Ball Deflector Assembly, 500-6433-00 (Items 1-9)

Stops the ball in the Left Orbit.



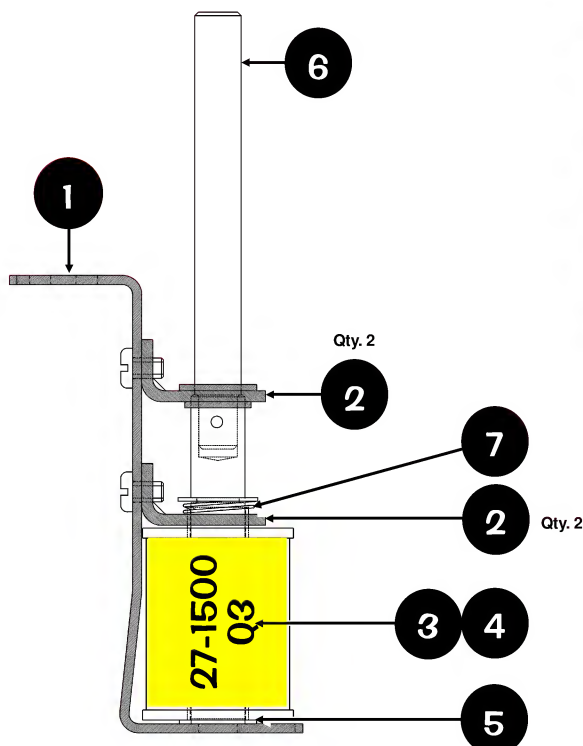
Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Ball Deflector Coil Mounting Bracket	1	535-6857-02
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00)			
2	Coil Retaining Bracket	1	535-5203-03
Item 2 is secured to Item 1 by: #8-32 X 1/4" PPH MS (Sems) (Qty. 2) (232-5300-00)			
3	Coil, 26-1200	1	090-5044-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
— Diode, 1N4004 (positioned at top)			
4	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01
5	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
6	Solid Plunger Assembly (Tapered Top)	1	515-7089-00
7	Post Black Rubber (Sleeve Tall)	1	545-5308-00
8	Compression (Relay) Spring	1	266-5022-01
9	#10-32 Adj. Spindle Stop w/Rubber Tip	1	280-5014-00
Item 9 is secured by: #10-32 Keps Nut (Qty. 1) (240-5208-00)			

Ordering Note: If 500-6433-00 is unavailable, order the individual part(s) actually required or try 500-5788-XX and change it's Solid Plunger with above Solid Plunger (515-7089-00) and ORDER the Post Rubber Sleeve (545-5308-00) to add to the tip. The Rubber Sleeve is not included with the Solid Plunger. **PERIODICALLY CHECK THIS RUBBER FOR WEAR.**



Ball Lock (Long Plunger) Assembly, 500-5867-04 (Items 1-8)

Locks and releases the ball(s) on the Left Wire Ramp.



Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Ball Lock Mounting Bracket Assy.	1	515-7132-00
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00)			
2	Coil Retaining Bracket	2	535-5203-03
Item 2 is secured by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2/per) (232-5300-00)			
3	Coil, 27-1500	1	090-5004-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
— Diode, 1N4004 (positioned at top)			
4	Coil Sleeve	1	545-5411-00
5	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
6	Solid Plunger Assy. (5.53" ID X .375" OD)	1	515-6119-04
7	Compression (Relay) Spring	1	266-5020-00
Item 7 is secured by: Retaining Ring, 7/16" ø Shaft (Qty. 1) (270-5005-00)			
8	Nyliner 7/16" Shaft (7L2-FF)	1	545-5418-01
Ordering Note: If 500-5867-04 is unavailable, order the individual part(s) actually required or try 500-5867-00 (4.9" Plunger) -01 (4.87" Plunger) -02 (3.81" Plunger) or -03 (5.81" Plunger) and change it's Solid Plunger with above Solid Plunger (515-6119-04).			

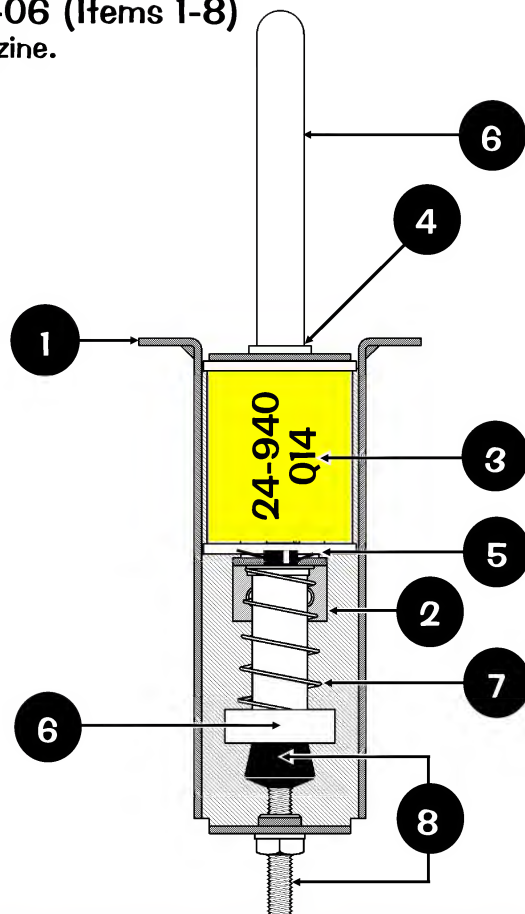


Sec. 4: Drawings ...

Up/Down Post Assy., 500-5788-06 (Items 1-8) Open & Closes the Magazine.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Ball Deflector Coil Mounting Bracket	1	535-6857-02
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00)			
2	Coil Retaining Bracket	1	535-5203-03
Item 2 is secured by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5300-00)			
3	Coil, 24-940	1	090-5036-00B
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
4	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01
5	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
6	Solid Plunger (Long) Assembly	1	515-7223-00
7	Compression (Relay) Spring	1	266-5022-01
8	#10-32 Adj. Spindle Stop w/Rubber Tip	1	280-5014-00
Item 8 is secured by: #10-32 Keps Nut (Qty. 1) (240-5208-00)			

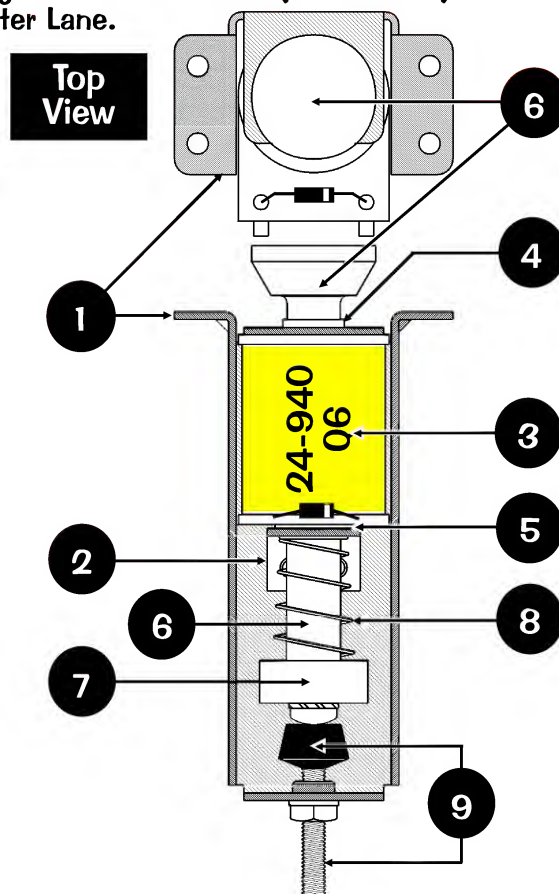
Ordering Note: If 500-5788-06 is unavailable, order the individual part(s) actually required or try 500-5788-XX and changes it's Solid Plunger with above Solid Plunger (515-7223-00). **PERIODICALLY CHECK THE NYLON PLUNGER TOP FOR WEAR.**



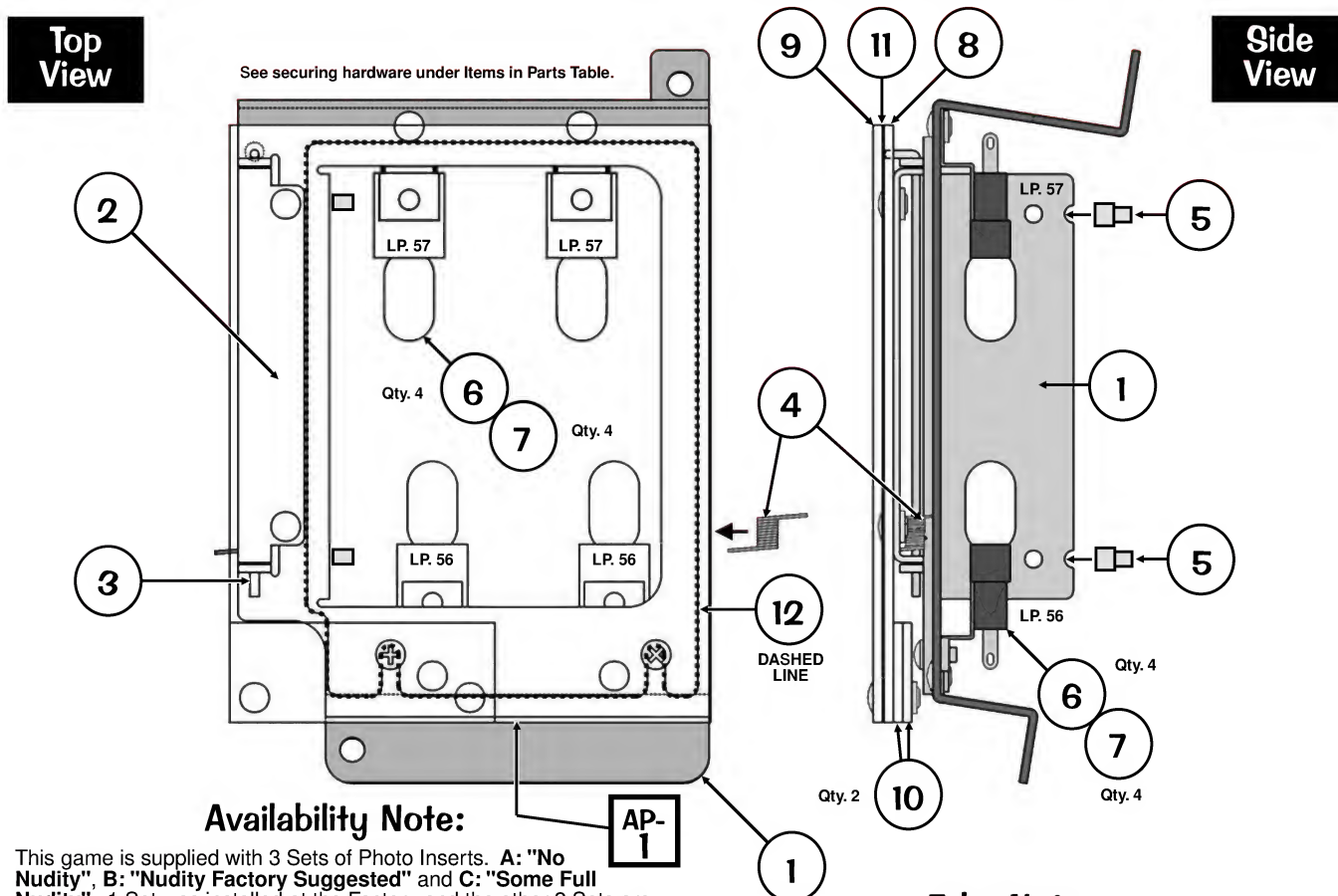
Ball Deflector (Wide Plunger Top) Assembly, 500-5788-07 (Items 1-9) Stops the ball in the Center Lane.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Ball Deflector Coil Mounting Bracket	1	535-6857-02
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00)			
2	Coil Retaining Bracket	1	535-5203-03
Item 2 is secured by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5300-00)			
3	Coil, 26-1200	1	090-5044-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
4	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01
5	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
6	Solid Plunger Assembly	1	515-7230-00
7	Shaft Head (Removable)	1	530-5511-00
Item 7 is secured by: #10-32 X 3/8" PPH MS (Sems) (Qty. 1) (232-5401-00)			
8	Compression (Relay) Spring	1	266-5022-01
9	#10-32 Adj. Spindle Stop w/Rubber Tip	1	280-5014-00
Item 9 is secured by: #10-32 Keps Nut (Qty. 1) (240-5208-00)			

Ordering Note: If 500-5788-07 is unavailable, order the individual part(s) actually required or try 500-5788-XX and changes it's Solid Plunger with above Solid Plunger (515-7230-00) and ORDER the "Removable" Shaft Head (530-5511-00) & #10-32 X 3/8" Screw (232-5401-00) to add to the bottom. The Shaft Head is not included with the Solid Plunger. **PERIODICALLY CHECK THE NYLON PLUNGER TOP FOR WEAR.**



Magazine Assembly (500-6556-00) (Items 1-13)
Not sold as an assembly, order the individual part(s) actually required.



Availability Note:

This game is supplied with 3 Sets of Photo Inserts. **A: "No Nudity"**, **B: "Nudity Factory Suggested"** and **C: "Some Full Nudity"**. 1 Set was installed at the Factory and the other 2 Sets are packed with the game. **Read the Instruction Sheet (756-5009-00)** which is provided with the Photo Insert Kit inside this game. For the same 3 Sets, order Kit **502-5010-00**, no other style Photo Inserts are available.

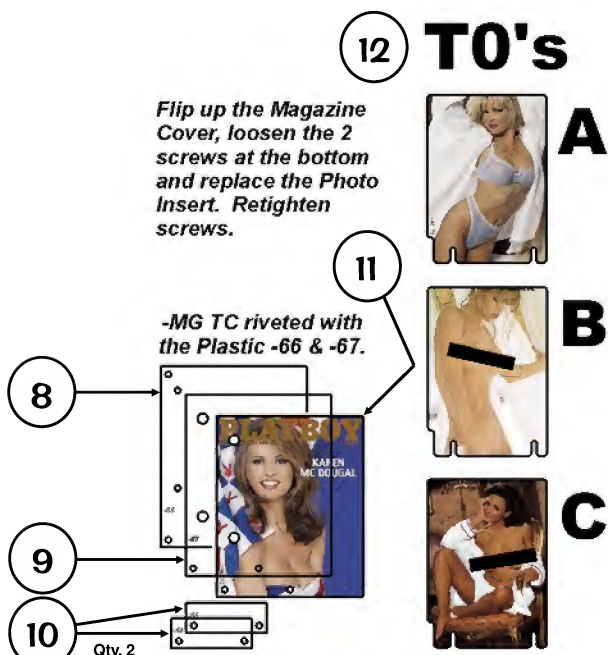
Items 8-12, & AP-1: Plastics, Photo Inserts & Decal. are not available individually. The entire Set(s) and/or Kit(s) must be ordered. See Section 4, Chapter 1, Page 63 for Plastics & Decals.

Take Note:

* An asterisk (*) indicates item(s) are not noted in the pictorials.

Nº	INDIVIDUAL PART NAME	QTY.	9PI PART Nº
1	Magazine Frame (Bracket)	1	535-9073-00
Item 1 is secured above the playfield onto Post by: #6-32 Nylon Stop Nut (Qty. 1) (240-5005-00) and onto the Wood Rail by: #6 X 1/2" PTH A (Zinc) (Qty. 1) (237-5809-00)			
2	Magazine Hinge	1	535-9072-00
3	Magazine Hinge Pin	1	535-9071-00
4	Spring (Torsion)	1	267-5000-00
5	4" Cable Tie (secures Wiring to Frame)	2	040-5001-01
6	#555 Wedge Base Socket (Laydown)	4	077-5026-01
7	#555 Wedge Base Bulb (Clear)	4	165-5002-00
Items 6 & 7 are secured to Item 1 above by: Rivet, 1/8" ø X .39" Zinc (Qty. 1/per) (249-5018-00)			
8	Clear Plastic -66 TO	1	from 830-5989-XX
9	Clear Plastic -67 TO	1	from 830-5989-XX
Items 8 & 9 are secured to Item 2 above by: Rivet, 1/8" ø X 3/16" Zinc (Qty. 2) (249-5018-01) and #6 Lock Washer (Qty. 2) (246-5000-00)			
10	Clear Plastic -65 (used as Impact Pads)	2	from 830-5989-XX
Item 10 is secured onto Items 8 & 9 by: Pop Rivet, 1/8" ø X .515" Lg. (Qty. 2) (249-5018-01) and #4 Washer (Qty. 2) (242-5002-00)			
11	Photo Insert -MC TC (1 Style Only)	1	from 502-5010-00
Item 11 is secured inbetween Items 8 & 9 by: See securing hardware under Item 9.			
12	Photo Insert -TO (3 Styles A, B & C)	1	from 502-5010-00
Item 12 is secured on Item 1 above by: #4-40 X 3/8" PPH MS (Qty. 2) (237-5997-00) and #4 Washer (Qty. 2) (242-5002-00) Ensure Photo Insert is under the Washers.			
Items 8-12: READ "Availability Note" above Photo Inserts on ordering availability.			
13*	Wiring Harness & 4-Pin Connector	1	036-5477-09-76
If replacing sockets, desolder wiring (use above # if new wiring is required). Don't forget to ADD the lug insulators (Shrink Tubing, 605-5004-01 sold in 12" Lengths).			

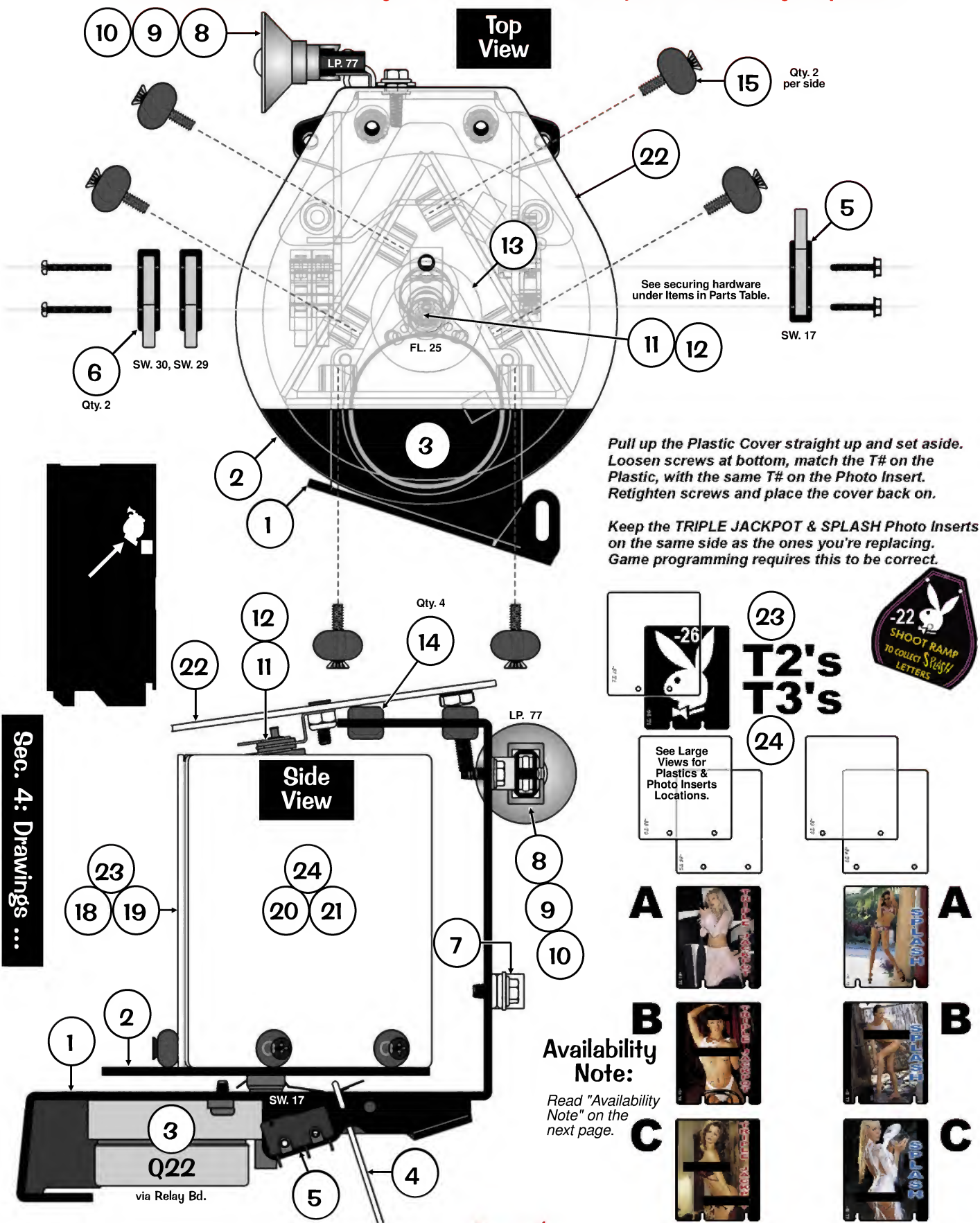
Nº	ASSOCIATED PART NAME	QTY.	9PI PART Nº
AP-1*	Decal -14 (Skill Shot Opens Magazine)	1	from 820-6305-00
Items AP-1: READ "Availability Note" above Photo Inserts on ordering availability.			



Rotating Triangular Billboard Assembly (500-6546-00) (Items 1-25)

Another View & Parts Table continues on the next page.

Not sold as an assembly, order the individual part(s) actually required.

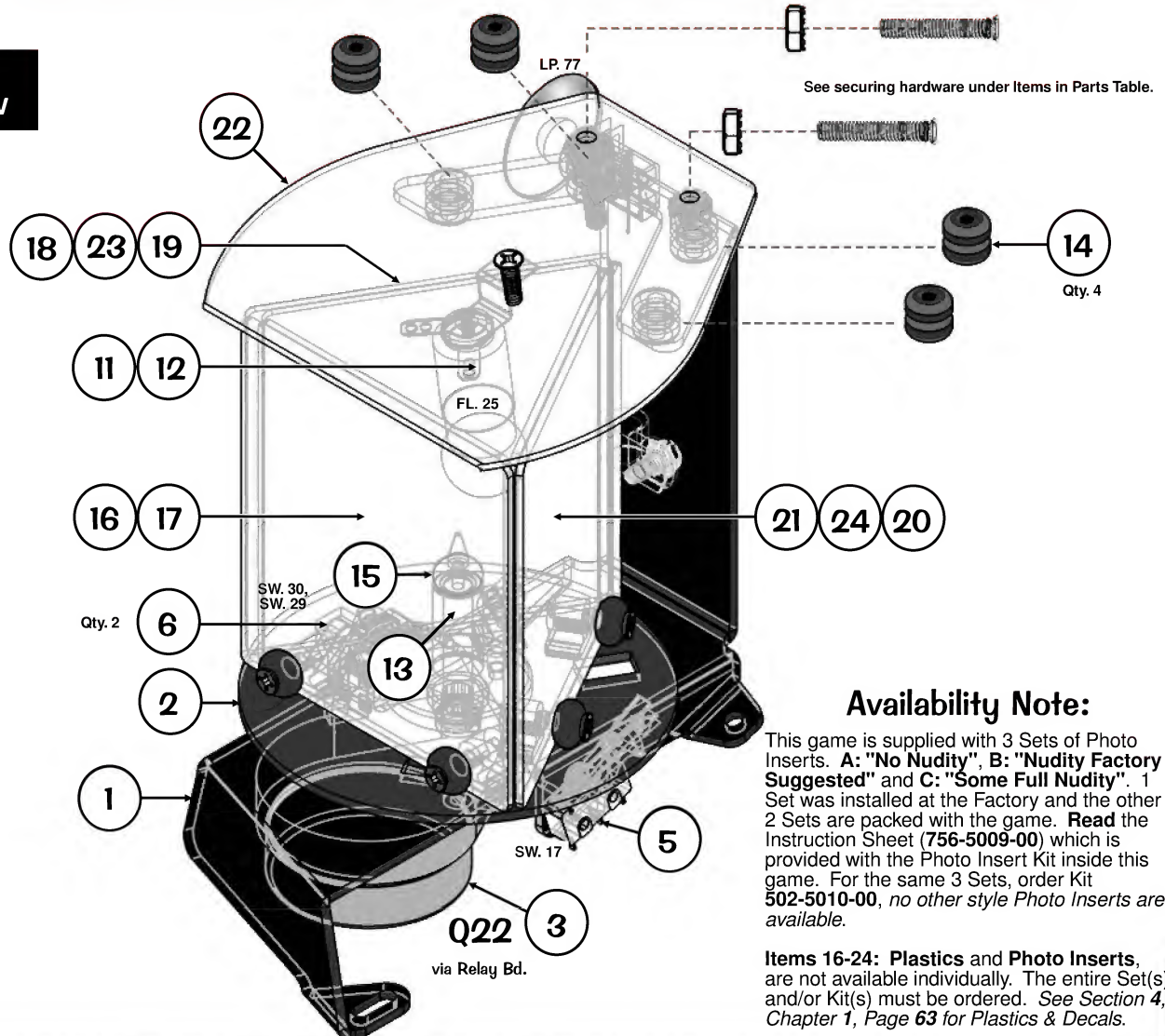


Rotating Triangular Billboard Assembly (500-6546-00) (Items 1-25) Continued

Different Views on the previous page.

Not sold as an assembly, order the individual part(s) actually required.

3D
View



Availability Note:

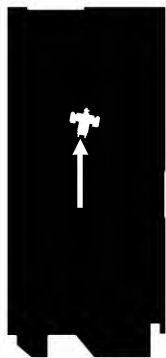
This game is supplied with 3 Sets of Photo Inserts. **A: "No Nudity"**, **B: "Nudity Factory Suggested"** and **C: "Some Full Nudity"**. 1 Set was installed at the Factory and the other 2 Sets are packed with the game. **Read the Instruction Sheet (756-5009-00)** which is provided with the Photo Insert Kit inside this game. For the same 3 Sets, order Kit **502-5010-00**, no other style Photo Inserts are available.

Items 16-24: Plastics and Photo Inserts. are not available individually. The entire Set(s) and/or Kit(s) must be ordered. See Section 4, Chapter 1, Page 63 for Plastics & Decals.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Motor Platform Frame (Bracket) Black	1	535-9040-00	13	White Nylon Bushing	1	545-5192-00
Item 1 is secured above the playfield in the front by: #6-32 X 1/2" HWH Swage (Ser) Zinc (Qty. 1) (237-5976-03) and #6 Washer (Qty. 1) (242-5001-00) and secured in the rear by: #8-32 X 3/8" HWH TF (Qty. 2) (237-5903-00)				Item 13 is secured to Item 2 by: #6-32 X 3/8" HWH Swage (Ser) Zinc (Qty. 3) (237-5976-02)			
2	Rotor Platform Assy. (w/Shaft & "Barrels")	1	515-7206-00	14	Rubber Grommet (Double Edged)	4	280-5015-00
3	Motor 24v AC 50/60 Hz 12 RPM PB2 w/Conn.	1	041-5086-02	15	3/8" O.D. BLACK Rubber Ring	7	545-5348-19
Item 3 is secured to Item 1 by: #6-32 X 5/16" PPH TF (Zinc) (Qty. 2) (237-6096-00)				16	Clear Plastic -57 T1	1	from 830-5989-XX
4	Wire Gate	1	535-9043-48	17	Screened Plastic -26 T1	1	from 830-5988-XX
5	Micro Switch (Short Flat Actuator)	1	180-5190-28	18	Clear Plastic -55 T2	1	from 830-5989-XX
Item 5 is secured to Item 1 by: #2-56 X 1/2" HWH Ser UNS #4HD TR3 BLK (Qty. 2) (237-5937-02) and #2-56 Nylon Stop Nut (Qty. 2) (240-5321-00)				19	Clear Plastic -56 T2	1	from 830-5989-XX
6	Micro Switch (Short Flat/Mid Bend Actuator)	2	180-5189-00	20	Clear Plastic -53 T3	1	from 830-5989-XX
Item 6 is secured to Item 1 by: #2-56 X 3/4" PPH (Zinc) (Qty. 2) (237-6064-00) and #2-56 Nylon Stop Nut (Qty. 2) (240-5321-00)				21	Clear Plastic -54 T3	1	from 830-5989-XX
7	1/4" Clamp (Double)	1	040-5000-23	Items 16-21 are secured into Item 2 by: #6-32 X 3/4" PPH Black Oxide (Qty. 2/per) (237-5836-01) with Item 15 (Qty. 1/per)			
Item 7 is secured to Item 1 by: #8-32 X 3/8" HWH MS Type C (Qty. 1) (237-5903-00) and #8 Washer (Qty. 1) (242-5005-00)				22	Screened Plastic -22	1	from 830-5988-XX
8	#555 Wedge Base Socket (Laydown)	1	077-5026-01	Item 22 is secured into Item 14 on Item 1 by: #8-32 X 1" Perm Self-Clinching Stud (Qty. 2) (237-5867-16) and #8-32 Keps Nut (Qty. 2) (240-5104-00)			
9	Light Reflector (Silver Plastic)	1	545-5409-01	23	Photo Insert -T2 (3 Styles A, B & C)	1	from 502-5010-00
10	#555 Wedge Base Bulb (Clear)	1	165-5002-00	24	Photo Insert -T3 (3 Styles A, B & C)	1	from 502-5010-00
Items 8, 9 & 10 are secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser) Zinc (Qty. 1) (237-5976-02)				Item 23 is secured inbetween Items 18-19; Item 24 is secured inbetween Items 20-21.			
11	#89 2-Lug Stand-Up Small Socket	1	077-5106-00	Items 16-24: READ "Availability Note" above on ordering availability.			
12	#89 Bulb (Bayonet)	1	165-5000-89	25*	Wiring Harness & 2-Pin + 9-Pin C.Ns.	1	036-5477-16-76
Items 11 & 12 are secured to Item 22 by: #6-32 X 1/2" PPH Black Oxide (Qty. 1) (237-5843-00) and #6-32 Nylon Stop Nut (Qty. 1) (240-5005-00)				If replacing sockets and/or switches, desolder wiring (use above # if new wiring is required). Don't forget to ADD the lug insulators (Shrink Tubing, 605-5004-01 sold in 12" Lengths).			

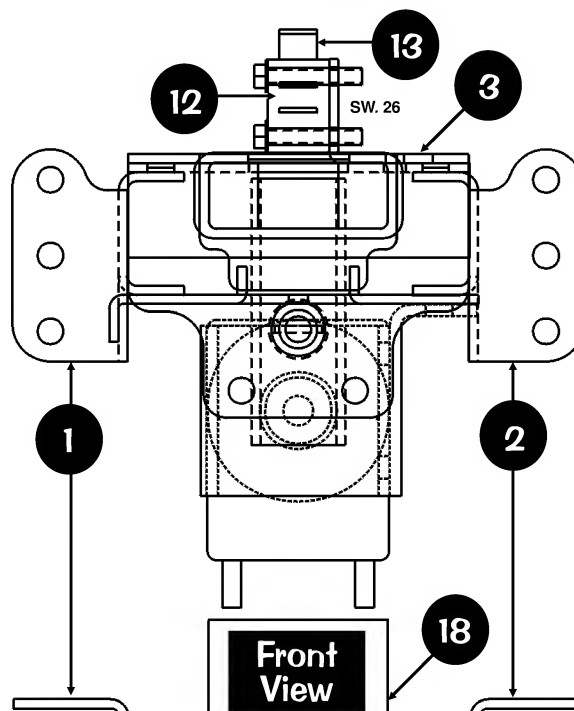
1-Bank Drop Target Assembly, 500-6440-11 (Items 1-20)

Another View & Parts Table continues on the next page.



Top View

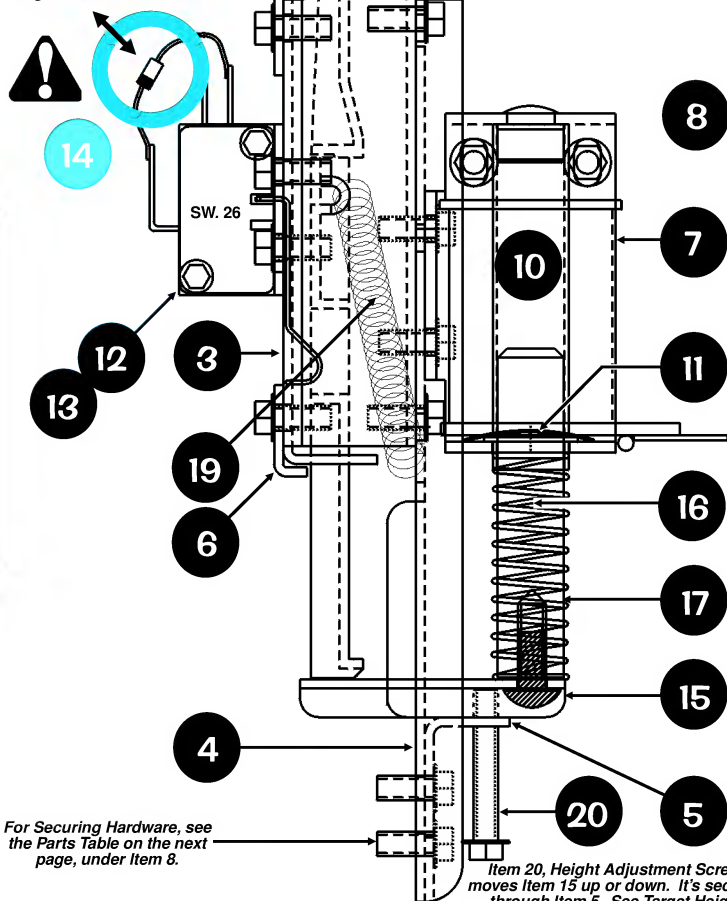
For Securing Hardware, see the Parts Table on the next page, under Item desired.



Side View

DOTS: The Switch Diode is located on a Terminal Strip under the playfield near this assembly. See Section 5, Chapter 2, Playfield Wiring, Page 101, for more details.

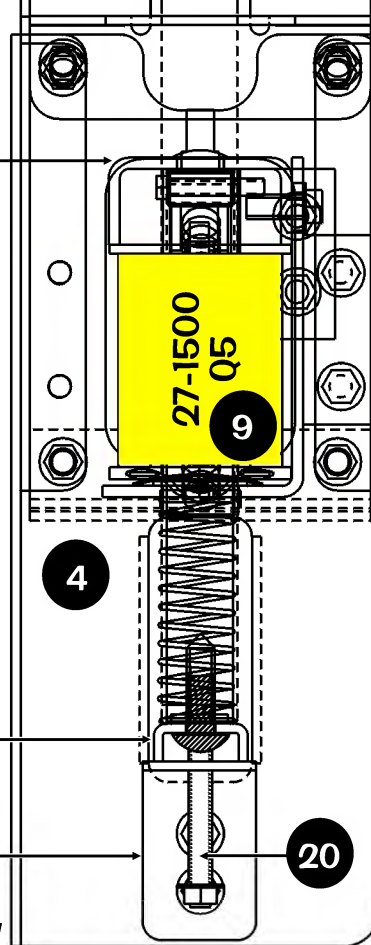
Trip Coil Not Required



For Securing Hardware, see the Parts Table on the next page, under Item 8.

Item 20, Height Adjustment Screw, moves Item 15 up or down. It's secured through Item 5. See Target Height Adjustment Procedure on the next page.

Front View



Sec. 4: Drawings ...



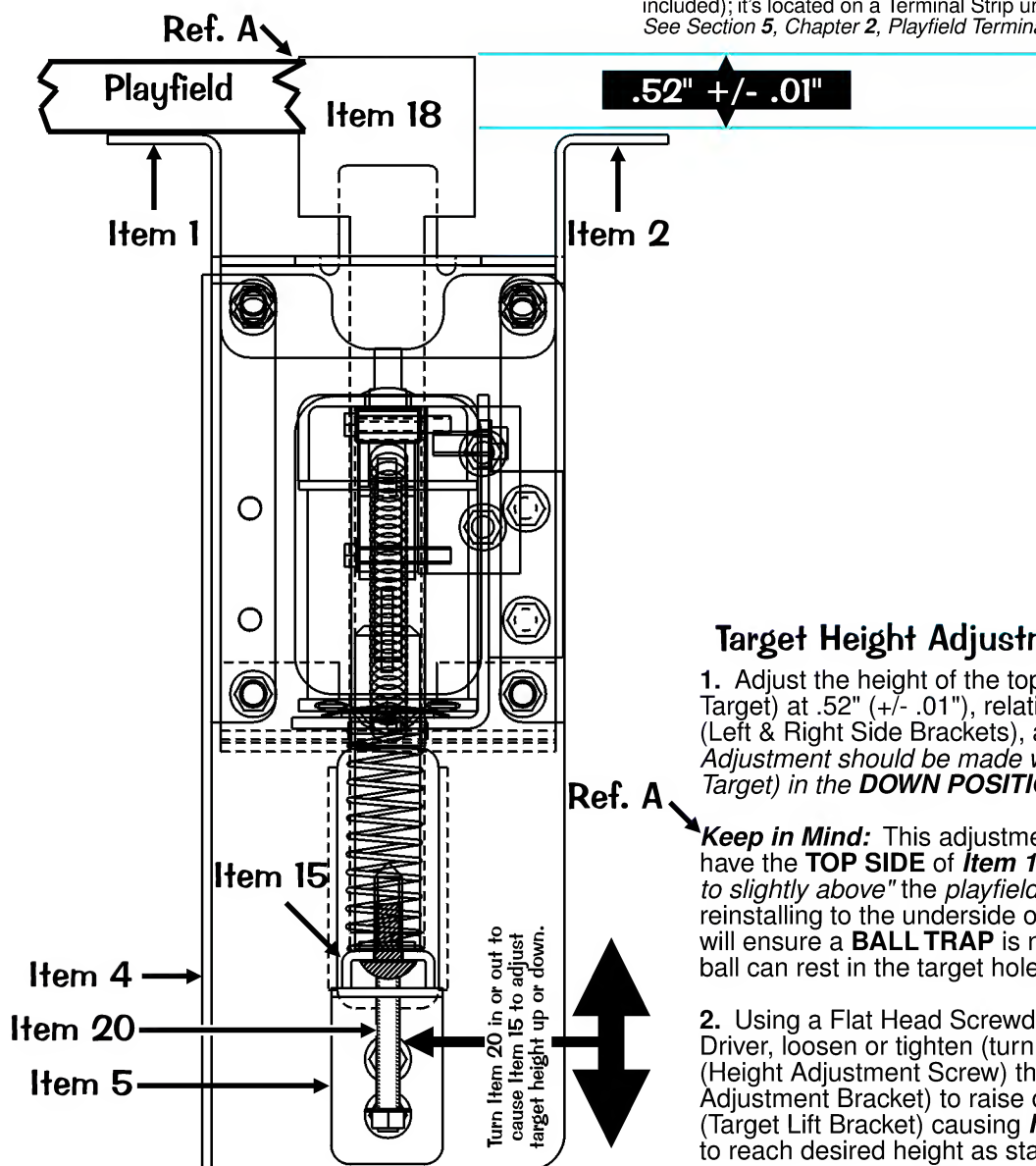
1-Bank Drop Target Assembly, 500-6440-11 (Items 1-20) Continued

Different Views on the previous page.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Bracket Drop Target (Left Side)	1	535-8746-00	12	Bracket, Switch (1-Bank D/T)	1	535-7710-00
2	Bracket Drop Target (Right Side)	1	535-8746-01	13	Switch (D/T)	1	180-5158-00
Items 1 & 2 are secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 3/per) (234-5101-00)				Item 13 is secured to Item 12 by: #4-40 X 5/8" HWH TF (Qty. 2) (237-5945-00)			
3	Back Plate (1-Bank Drop Target)	1	535-7713-00	14	Switch Diode, 1N4001	0	112-5001-00
4	Bracket, Support (1-Bank D/T)	1	535-7712-00	See "Take Note" below.			
5	Bracket, Height Adjustment	1	535-7709-01	15	Bracket, Target Lift (1-Bank D/T)	1	535-7706-01
6	Bracket, Target Retainer (1-Bank D/T)	1	535-7728-00	16	Plunger (Drive Coil)	1	530-5410-00
7	Bracket, Coil Housing	1	535-7707-00	Item 16 is secured to Item 15 by: #10-32 X 3/8" PPH (Sems) (Qty. 1) (232-5401-00)			
8	Bracket Cap, Coil Housing	1	515-6533-00	To order Items 15-16 assembled with securing hardware, use SPI Nº: 515-6537-00.			
Items 1-3, 5, 7-8 are secured to Item 4 by: #8-32 X 3/8" HWH Swg. (Qty. 16) (237-5975-00)				17	Compression (Return) Spring	1	266-5020-00
9	Coil, 27-1500	1	090-5004-00B	18	Drop Target White (Rollover Target)	1	545-5533-01
ORDERING ABOVE (ITEM 9) COIL PART Nº WILL INCLUDE:				Note: Individual Decal Not Available. The entire decal sheet must be ordered for replacement. See Page 57 for part number.			
—	Diode, 1N4004 (positioned at bottom)	1	112-5003-00	19	Spring, Target Reset	1	265-5003-00
10	Coil Sleeve	1	545-5709-00	20	Height Adj. Screw (#8-32 X 1" HWH)	1	237-6003-00
11	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00	Ordering Note: If 500-6440-11 is unavailable, order the individual part(s) actually required or try 500-6440-01 and remove the Trip Coil & Bracket from Item 4 (Note: Item 5, Height Adj. Bracket may differ slightly). Also, ensure the diode on the switch is soldered correctly.			
To order Items 7-11 assembled with securing hardware, use SPI Nº: 515-6535-01.							

Take Note:

The Switch Diode, 1N4001, is not located on this assembly (nor included); it's located on a Terminal Strip under the playfield. See Section 5, Chapter 2, Playfield Terminal Strips..., Page 101.



Target Height Adjustment Procedure:

1. Adjust the height of the top of **Item 18** (Rollover Target) at .52" (+/- .01"), relative to **Items 1 & 2** (Left & Right Side Brackets), as shown left. Adjustment should be made with **Item 18** (Drop Target) in the **DOWN POSITION**.

Keep in Mind: This adjustment procedure should have the **TOP SIDE** of **Item 18** (Drop Target) "flush to slightly above" the playfield surface after reinstalling to the underside of the Playfield. This will ensure a **BALL TRAP** is not created where the ball can rest in the target hole above the playfield.

2. Using a Flat Head Screwdriver or a 1/4" Nut Driver, loosen or tighten (turn in or out) **Item 20** (Height Adjustment Screw) through **Item 5** (Height Adjustment Bracket) to raise or lower **Item 15** (Target Lift Bracket) causing **Item 18** (Drop Target) to reach desired height as stated above.

Centerfold Lower Assembly (515-7224-00) (Items 1-10)

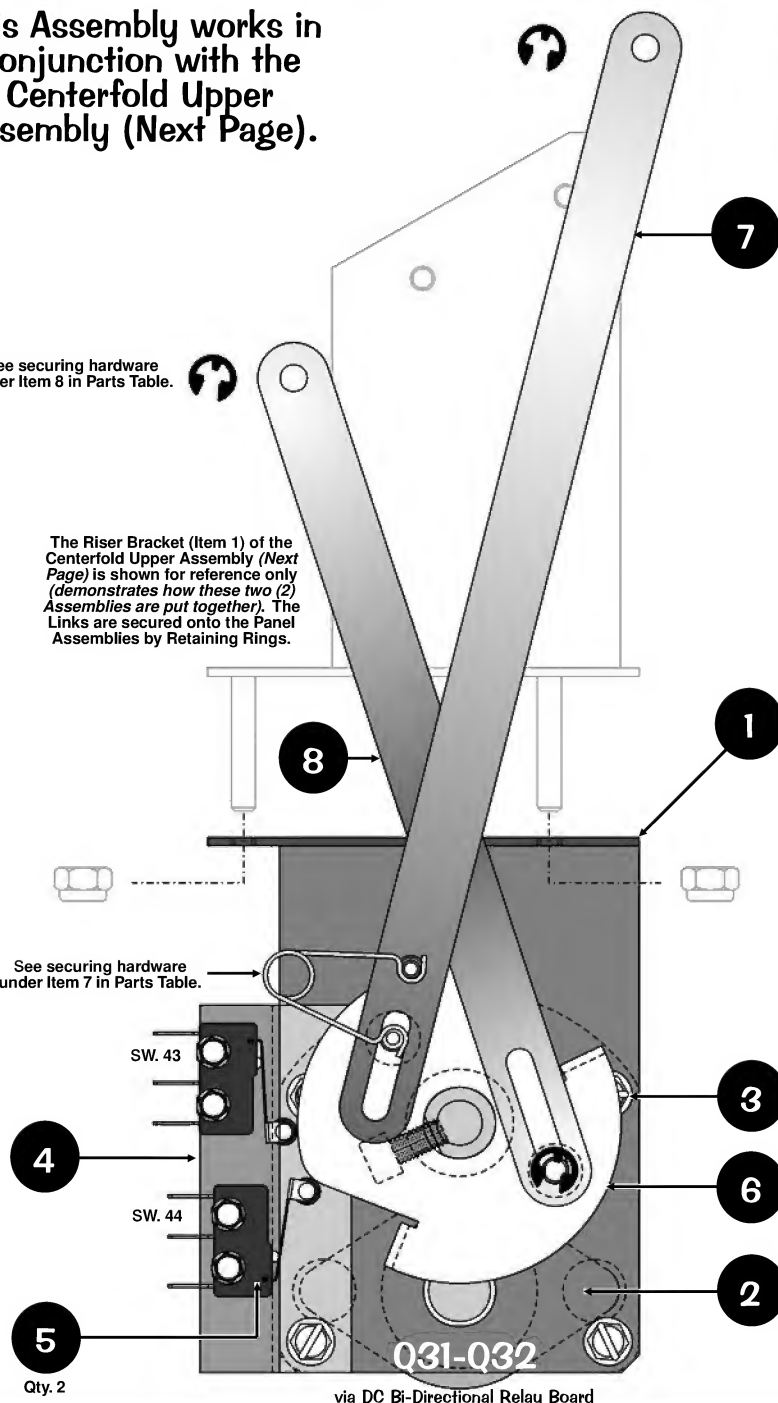
This Assembly works in conjunction with the Centerfold Upper Assembly (Next Page).

Not sold as an assembly, order the individual part(s) actually required.

See securing hardware under Item 8 in Parts Table.

The Riser Bracket (Item 1) of the Centerfold Upper Assembly (Next Page) is shown for reference only (demonstrates how these two (2) Assemblies are put together). The Links are secured onto the Panel Assemblies by Retaining Rings.

See securing hardware under Item 7 in Parts Table.



Sec. 4: Drawings ...

Nº	INDIVIDUAL PART NAME	QTY.	9PI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	9PI PART Nº
1	Motor Mounting Bracket	1	535-9062-00	7	Link, Slotted (9/16" w/Post Stud) Assy.	1	515-7226-00
Item 1 is secured below the playfield onto Item 1, Riser Bracket of the Upper Assembly (Next Page) by: #8-32 Nylon Stop Nut (Qty. 2) (240-5102-00)				Item 7 is secured onto the Cam Pin on Item 6 by: Link Spring (Qty. 1) (266-5070-00)			
2	Motor 12v DC 10-12RPM	1	041-5075-04	8	Link, Slotted (7/8")	1	535-9061-00
Item 2 is secured to Item 1 by: #8-32 X 5/8" HWH MS (Serr) Zc TF (Qty. 1) (237-5951-00)				Item 8 is secured onto the Picture Link Pivot on Item 6 by: Retaining Ring, 3/16" ø Shaft (Qty. 1) (270-5001-00)			
3	Stop Pin (8-32 X 15/16")	1	530-5609-00	9*	Wiring Harness & 2-Pin Cn. (for Motor)	1	036-5477-10-76
Item 3 is secured to Item 1 by: #8-32 X 1 1/2" HWH (Serr) Zinc (Qty. 1) (237-5946-00)				If replacing motor, desolder wiring (use above # if new wiring is required). Don't forget to ADD the lug insulators (Shrink Tubing, 605-5004-01 sold in 12" Lengths).			
4	Dual Switch Bracket	1	535-9063-00	10*	Wiring Harness & 4-Pin Cn. (for Sws.)	1	036-5477-11-76
Item 4 is secured by: #8-32 X 5/8" HWH MS (Serr) Zinc TF (Qty. 2) (237-5951-00)				If replacing motor, desolder wiring (use above # if new wiring is required). Don't forget to ADD the lug insulators (Shrink Tubing, 605-5004-01 sold in 12" Lengths).			
5	Micro Switch (Roller Actuator, Lite-Force)	2	180-5119-02				
Item 5 is secured to Item 1 by: #2-56 X 1 1/2" HWH (Sr) UNS #4HD TR3 BO (Qty. 6) (237-5937-02)							
6	Cam Assembly	1	515-7225-00				
Item 6 is secured onto Motor Shaft by: #10-32 X 3/8" Soc. Hd. Cap Screw (Zinc) (Qty. 1) (237-5845-00) Includes: Cam Hub (530-5606-00), Cam Pin (530-5607-00), Picture Link Pivot (530-5610-00) and Cam Blade (535-9059-00).							

Take Note:

* An asterisk (*) indicates item(s) are not noted in the pictorials.



Centerfold Upper Assembly (515-7227-00) (Items 1-14)
Not sold as an assembly, order the individual part(s) actually required.

T4's, T5's & T6's

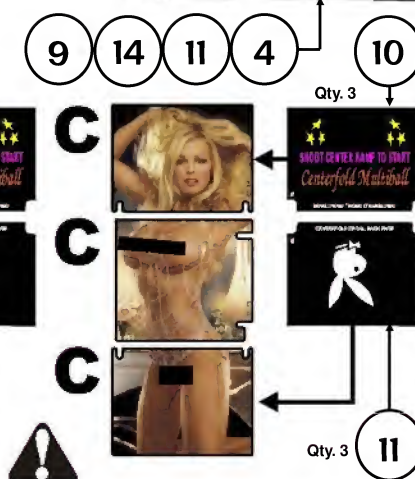
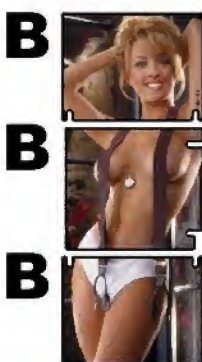
This Assembly works in conjunction with the Centerfold Lower Assembly (Previous Page).



Ensure Back Page Decals -T4 & -T6 are affixed to the rear of all T4 & T6 Photo Inserts.



Do Not Open This Assembly with your Hands!
 Enter Diagnostics!
 See Page 27.



Please note the Caution above! Enter Diagnostics, Playboy Test, Centerfold Motor Test (see Pgs. 8 & 27 for details on entering). Loosen screws, match the T# on the Plastic, with the same T# on the Photo Insert. Retighten screws and exit Diagnostics.

Availability Note:

This game is supplied with 3 Sets of Photo Inserts. A: "No Nudity", B: "Nudity Factory Suggested" and C: "Some Full Nudity". 1 Set was installed at the Factory and the other 2 Sets are packed with the game. Read the Instruction Sheet (756-5009-00) which is provided with the Photo Insert Kit inside this game. For the same 3 Sets, order Kit 502-5010-00, no other style Photo Inserts are available.

Items 7-14: Plastics, Photo Inserts & Decals, are not available individually. The entire Set(s) and/or Kit(s) must be ordered. (Decals T4 & T6 are provided with the Photo Insert Kit Set.) See Section 4, Chapter 1, Page 63 for Plastics & Decals.

SW. 44

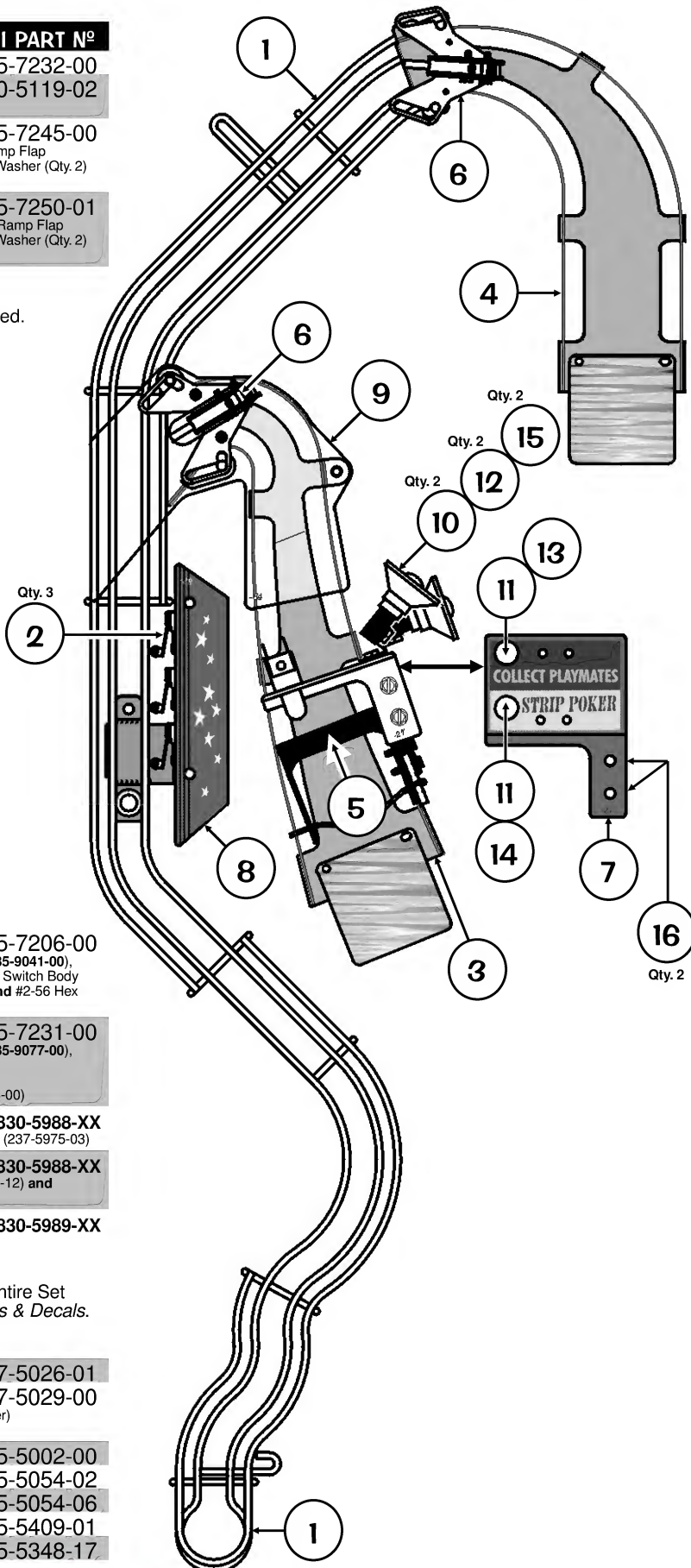
Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Riser Bracket	1	535-9068-00	8	Clear Plastic -62 T5	1	from 830-5989-XX
Item 1 is secured above the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 1) (234-5101-00) and is secured below the playfield onto Item 1, Motor Mounting Bracket of the Lower Assembly (Previous Page) by: #8-32 Nylon Stop Nut (Qty. 2) (240-5102-00)				9	Clear Plastic -63 T6	1	from 830-5989-XX
2	Panel (Middle) Mounting Bracket	1	535-9069-00	Items 7-9 are secured by: #6-32 X 1/4" PPH (Sems) Zinc (Qty. 2/per) (232-5200-00)			
Item 2 is secured onto Item 1 by: #8-32 Nylon Stop Nut (Qty. 2) (240-5102-00)				10	Decal -T4 (... Centerfold Multiball)	3	from 820-6305-XX
3	Panel (Top) Mounting Assembly	1	515-7228-00	Item 10 is affixed to the back side of Item 12 as shown above.			
4	Panel (Bottom) Mounting Assembly	1	515-7229-00	11	Decal -T6 (... White Rabbit Head on Black)	3	from 820-6305-XX
5	Hinge Pin	2	535-9074-00	Item 11 is affixed to the back side of Item 14 as shown above.			
Item 5 is secured at left by: Pushnut, 1/16" Tinnerman PS 062032 (Qty. 1/per) (240-5334-00) and Optional #4 Nylon Washer (Qty. 1) (242-5068-00) on lower Hinge Pin Right Side.				12	Photo Insert -T4 (3 Styles A, B & C)	1	from 502-5010-00
6	Panel Spring	1	266-5071-00	13	Photo Insert -T5 (3 Styles A, B & C)	1	from 502-5010-00
7	Clear Plastic -61 T4	1	from 830-5989-XX	14	Photo Insert -T6 (3 Styles A, B & C)	1	from 502-5010-00
				Items 12-14 are secured under Items 7-9 above respectively.			
				Items 7-14: READ "Availability Note" above on ordering availability.			

Left Wire Ramp, Left & Middle Ramps & Individual Parts (Items 1-16)

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Left Wire Ramp	1	515-7232-00
2	Micro Switch (Roller Actuator, Lite Force)	3	180-5119-02
Item 2 is secured by: #2-56 X 1/2" HWH Serr (Qty. 2/per) (237-5937-02)			
3®	Steel Ramp (Left) Riveted Sub-Assy.	1	515-7245-00
For Individual Items use : Steel Ramp (Left, No Parts) (515-7196-00), Ramp Flap (535-8986-00), Rivet, 1/8" X 3/16" Lg. (Qty. 2) (249-5001-00) and #6 Lock Washer (Qty. 2) (246-5000-00).			
4®	Steel Ramp (Cntr.) Riveted Sub-Assy.	1	515-7250-01
For Individual Items use : Steel Ramp (Center, No Parts) (515-7184-01), Ramp Flap (535-8986-00), Rivet, 1/8" X 3/16" Lg. (Qty. 2) (249-5001-00) and #6 Lock Washer (Qty. 2) (246-5000-00).			

Take Note:

® "R" indicates Item noted is secured with rivet(s) as listed.



5 Roll-Under Gate & Switch Assembly 1 515-7206-00
For Individual Items use : Roll-Under Switch Mounting Bracket (Black) (535-9041-00), Wire Gate (535-9043-48), Micro Switch (Short Flat Actuator) (180-5190-28), Switch Body Protect Plate (535-6539-00), #2-56 X 1/2" HWH Sr (Qty. 2) (237-5937-02) and #2-56 Hex Nut (Qty. 2) (240-5301-00).

6 Cross-Under Gate & Switch Assembly 2 515-7231-00
For Individual Items use : Roll-Under Switch Mounting Bracket (Black) (535-9077-00), Micro Switch (Long Flat Actuator) (180-5190-48).

Item 6 is secured by: #8-32 X 3/8" HWH MS Type C (Qty. 2/per) (237-5903-00)

7 Screened Plastic -27 1 from 830-5988-XX
Item 7 is secured to Item 5 by: #8-32 X 5/8" HWH Swage (Ser) Zc. (Qty. 2) (237-5975-03)

8 Screened Plastic -28 1 from 830-5988-XX
Item 8 is secured to Item 1 by: 3/8" X 3/8" Spacer Gray (Qty. 2) (254-5000-12) and #6-32 X 3/4" PPH MS (Sems) Zinc (Qty. 2) (232-5204-00)

9 Clear Plastic -64 1 from 830-5989-XX

Availability Note:

Items 7-9: **Plastics**, are not available individually. The entire Set must be ordered. See Sec. 4, Chp. 1, Page 63 for Plastics & Decals.

10 #555 Wedge Base Socket (Laydown) 2 077-5026-01

11 #555 Wedge Base Socket (Offset) 2 077-5029-00

Items 10 & 11 are secured to Item 7 by: Rivet, 1/8" X 3/16" Lg. (Qty. 1/per) (249-5001-00) and #6 Lock Washer (Qty. 1/per) (246-5000-00).

12 #555 Wedge Base Bulb (Clear) 2 165-5002-00

13 #555 Wedge Base Bulb (Red) 1 165-5054-02

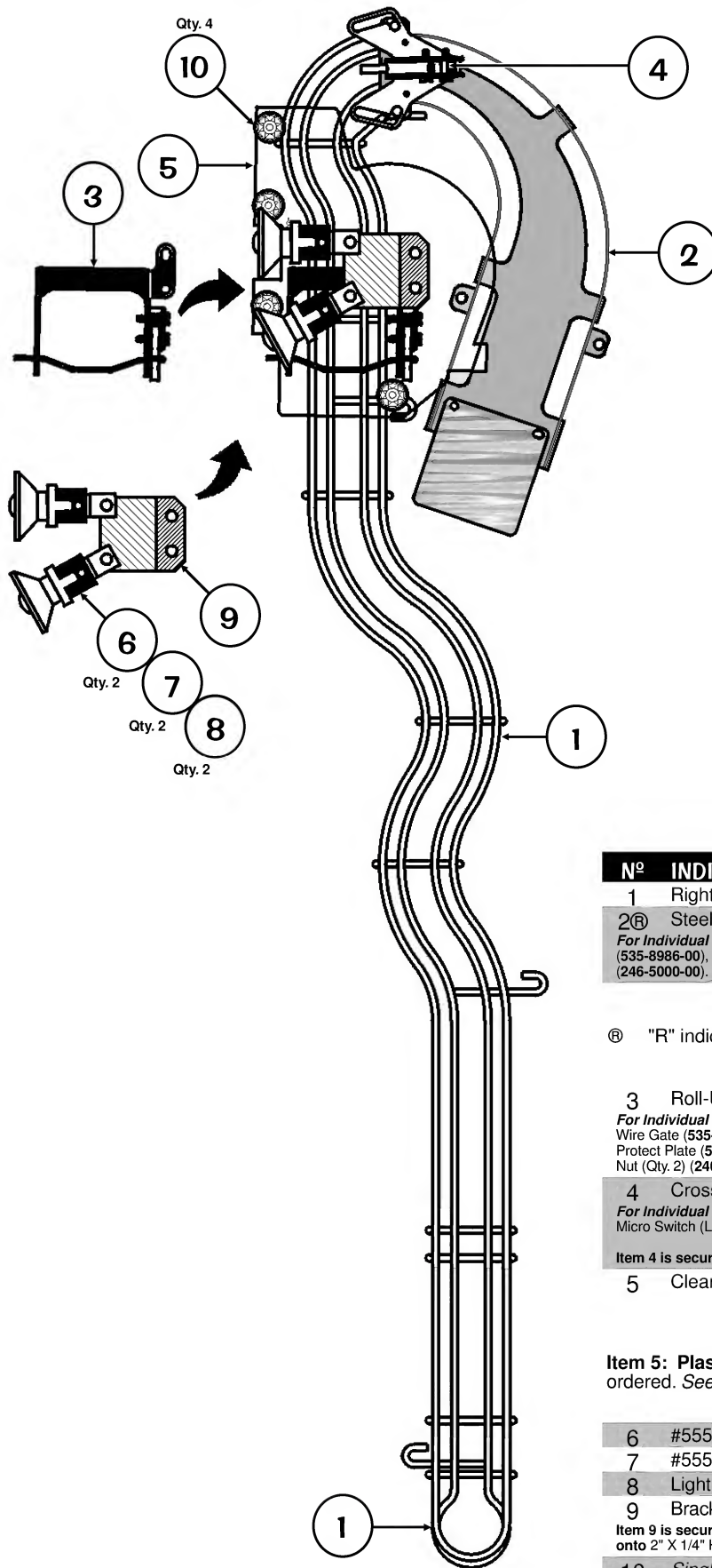
14 #555 Wedge Base Bulb (Yellow) 1 165-5054-06

15 Light Reflector (Silver Plastic) 2 545-5409-01

16 7/16" O.D. BLACK Rubber Ring 2 545-5348-17



Right Wire Ramp, Right Ramp & Individual Parts (1-10)



Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Right Wire Ramp	1	515-7194-00
2®	Steel Ramp (Right) Riveted Sub-Assy.	1	515-7250-00
<i>For Individual Items use :</i> Steel Ramp (Left, No Parts) (515-7184-00), Ramp Flap (535-8986-00), Rivet, 1/8"ø X 3/16" Lg. (Qty. 2) (249-5001-00) and #6 Lock Washer (Qty. 2) (246-5000-00).			

Take Note:

® "R" indicates Item noted is secured with rivet(s) as listed.

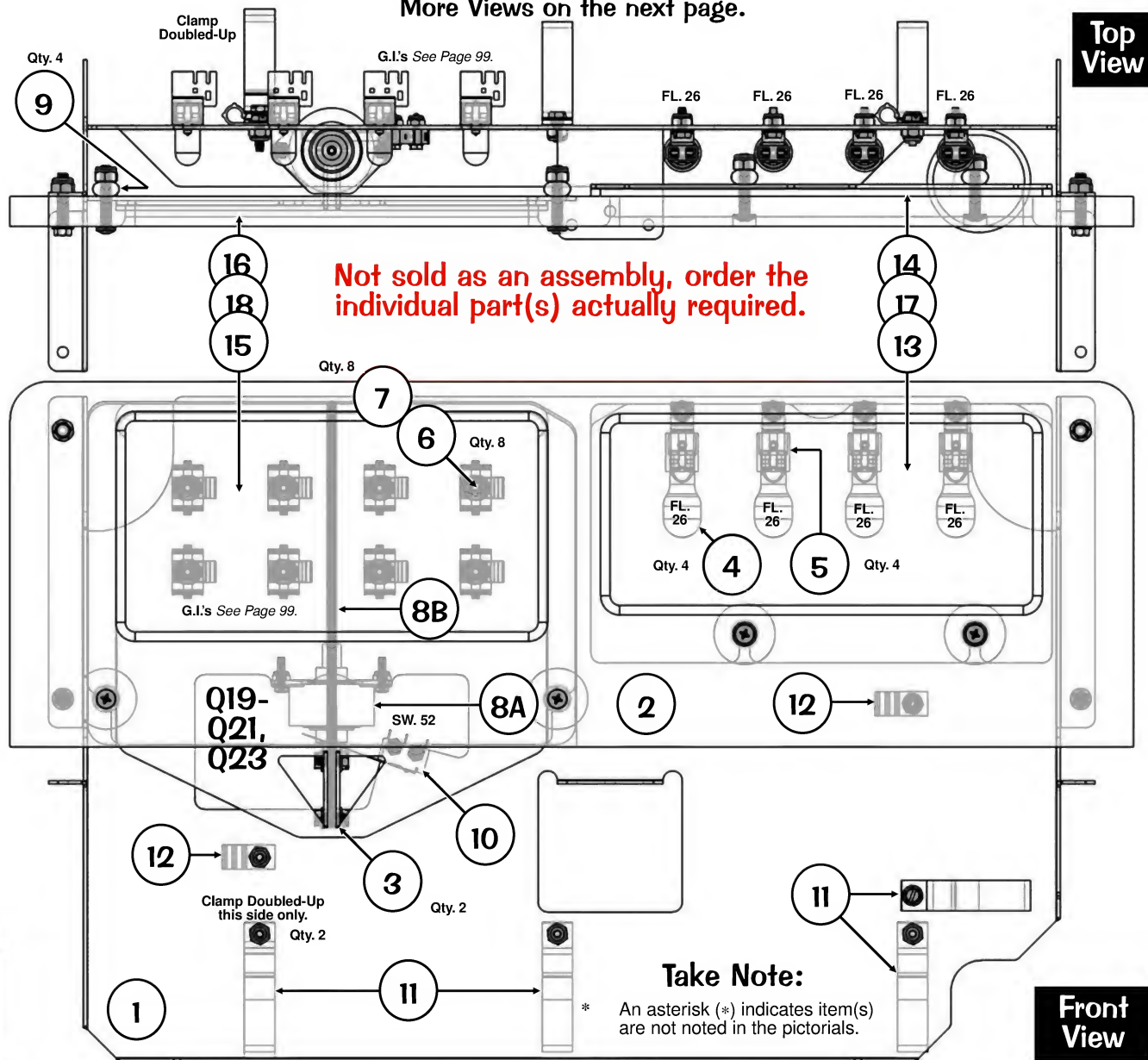
3	Roll-Under Gate & Switch Assembly	1	515-7206-00
<i>For Individual Items use :</i> Roll-Under Switch Mounting Bracket (Black) (535-9041-00), Wire Gate (535-9043-48), Micro Switch (Short Flat Actuator) (180-5190-28), Switch Body Protect Plate (535-6539-00), #2-56 X 1/2" HWH Sr (Qty. 2) (237-5937-02) and #2-56 Hex Nut (Qty. 2) (240-5301-00).			
4	Cross-Under Gate & Switch Assembly	1	515-7231-00
<i>For Individual Items use :</i> Roll-Under Switch Mounting Bracket (Black) (535-9077-00), Micro Switch (Long Flat Actuator) (180-5190-48).			
Item 4 is secured by: #8-32 X 3/8" HWH MS Type C (Qty. 2/per) (237-5903-00)			
5	Clear Plastic -69	1	from 830-5989-XX

Availability Note:

Item 5: Plastic, is not available individually. The entire Set must be ordered. See Section 4, Chapter 1, Page 63 for Plastics & Decals.

6	#555 Wedge Base Socket (Laydown)	2	077-5026-01
7	#555 Wedge Base Bulb (Clear)	2	165-5002-00
8	Light Reflector (Silver Plastic)	2	545-5409-01
9	Bracket, Dual Light Mounting (No Parts)	1	535-9138-00
Item 9 is secured to Item 5 by: #6-32 X 3/8" PPH MS (Sems) Zinc (Qty. 2) (232-5201-00) onto 2" X 1/4" Hex Spacer #6-32 Tap (Qty. 1/per) (254-5008-07)			
10	Single Groove Jewel Post (Clear)	4	550-5034-01
Item 10 is secured to Item 5 by: #6-32 X 1/2" PPH MS Zinc (Qty. 1/per) (232-5510-00) and #6-32 Nylon Stop Nut (Qty. 4) (240-5005-00)			

Back Panel Display & Stepper Motor Assembly (500-6552-00) (Items 1-19) More Views on the next page.



Sec. 4: Drawings ...

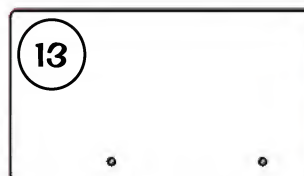
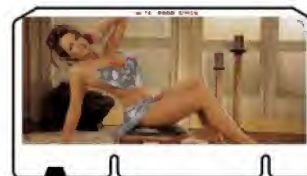
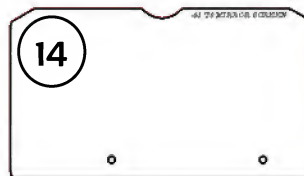
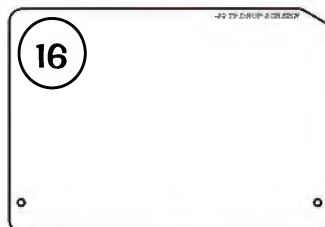
Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Display Frame (Painted White)	1	535-9052-00	10	Micro Switch (Long Flat Actuator)	1	180-5190-48
Item 1 is secured below the playfield in the middle by: #8 X 1/2" HWH AB (Zinc) (Qty. 2) (234-5101-00) and at sides by: #8-32 X 5/8" HWH MS (Serr) Zinc TF (Qty. 4) (237-5951-00)				Item 10 is secured by: #2-56 X 1/2" HWH Ser UNS #4HD TR3 BLK (Qty. 2) (237-5937-02) and #2-56 Nylon Stop Nut (Qty. 2) (240-5321-00)			
2	Back Panel Black Wood (No Parts)	1	525-5608-00	11	1 1/2" Clamp (Harness Clip Open Tab)	5	040-5000-10
Item 2 is secured to Item 1 at the top by: #8-32 X 7/8" HWH MS (Zinc) (Qty. 2) (237-5890-00) and at the bottom sides by: #8 X 1/2" HWH AB (Zinc) (Qty. 2) (234-5101-00) and bottom middle by: #8 X 1" HWH (Serr) Zinc (Qty. 1) (234-5105-00)				Item 11 & 12 are secured on Item 1 by: #6-32 X 3/8" HWH Swage (Ser) Zinc (Qty. 1/per) except where Item 10 is doubled-up used: #6-32 X 5/8" HWH Swage (Ser) Zinc (Qty. 1) and #6-32 Nylon Stop Nut (Qty. 1/per) (240-5005-00)			
3	Mounting Plate	2	535-9053-00	13	Plastic Mirror	1	820-6297-00
Item 3 secures Motor Shaft & Screened Plastic -25 and is secured by: #8-32 X 3/8" HWH MS Type-C (Qty. 4) (237-5903-00)				14	Clear Plastic -51 T8	1	from 820-5989-XX
4	#555 Wedge Base Socket (Laydown)	4	077-5026-01	15	Screened Plastic -25 T9	1	from 830-5988-XX
5	#906 Wedge Base Bulb (Clear)	4	165-5004-00	16	Clear Plastic -52 T9	1	from 830-5989-XX
Items 4 & 5 are secured to Item 1 by: #6-32 X 3/8" HWH Swage (Serr) Zinc (Qty. 1/per) and #6-32 Nylon Stop Nut (Qty. 1/per) (240-5005-00)				Items 13-16 are secured into Item 2 by: #8-32 X 1" PPH MS (Zinc) (Qty. 4) with Item 9 (Qty. 1/per)			
6	#555 IDC Snap-On Socket No Diode	8	077-5216-01	17	Photo Insert -T8 (3 Styles A, B & C)	1	from 502-5010-00
7	#555 Wedge Base Bulb (Clear)	8	165-5002-00	18	Photo Insert -T9 (3 Styles A, B & C)	1	from 502-5010-00
8A	HSI Stepper Motor Assembly	1	515-6794-00	Item 17 is secured inbetween Items 13-14; Item 18 is secured inbetween Items 15-16.			
Item 8 includes the Cable Wiring Harness & Connector. Item 8 is secured by Item 3 (onto shaft) and at sides by: #4-40 X 1/2" PPH (Sems) Zinc (Qty. 2) (237-5813-00) and #4-40 Nylon Stop Nut (Qty. 2) (240-5303-00) Motor Spec: (041-5062-00) 1.4"ø (Non-Captive Shaft) HSI #36864-12 (Unipolar) / Travel per Step = .004 Step Angle - 15° / 12v D.C. / 4.6W				Items 14-18, : READ "Availability Note" above on ordering availability.			
8B	Shaft 7"	1	530-5503-00	19*	Wiring Harness & 7-Pin + 12-Pin CNs	1	036-5477-02-76
9	3/8" O.D. BLACK Rubber Ring	4	545-5348-19	If replacing sockets, desolder wiring (use above # if new wiring is required). Don't forget to ADD the lug insulators (Shrink Tubing, 605-5004-01 sold in 12" Lengths). If replacing IDC sockets, ensure the wires are reinserted correctly with proper contact.			



Not sold as an assembly, order the individual part(s) actually required.

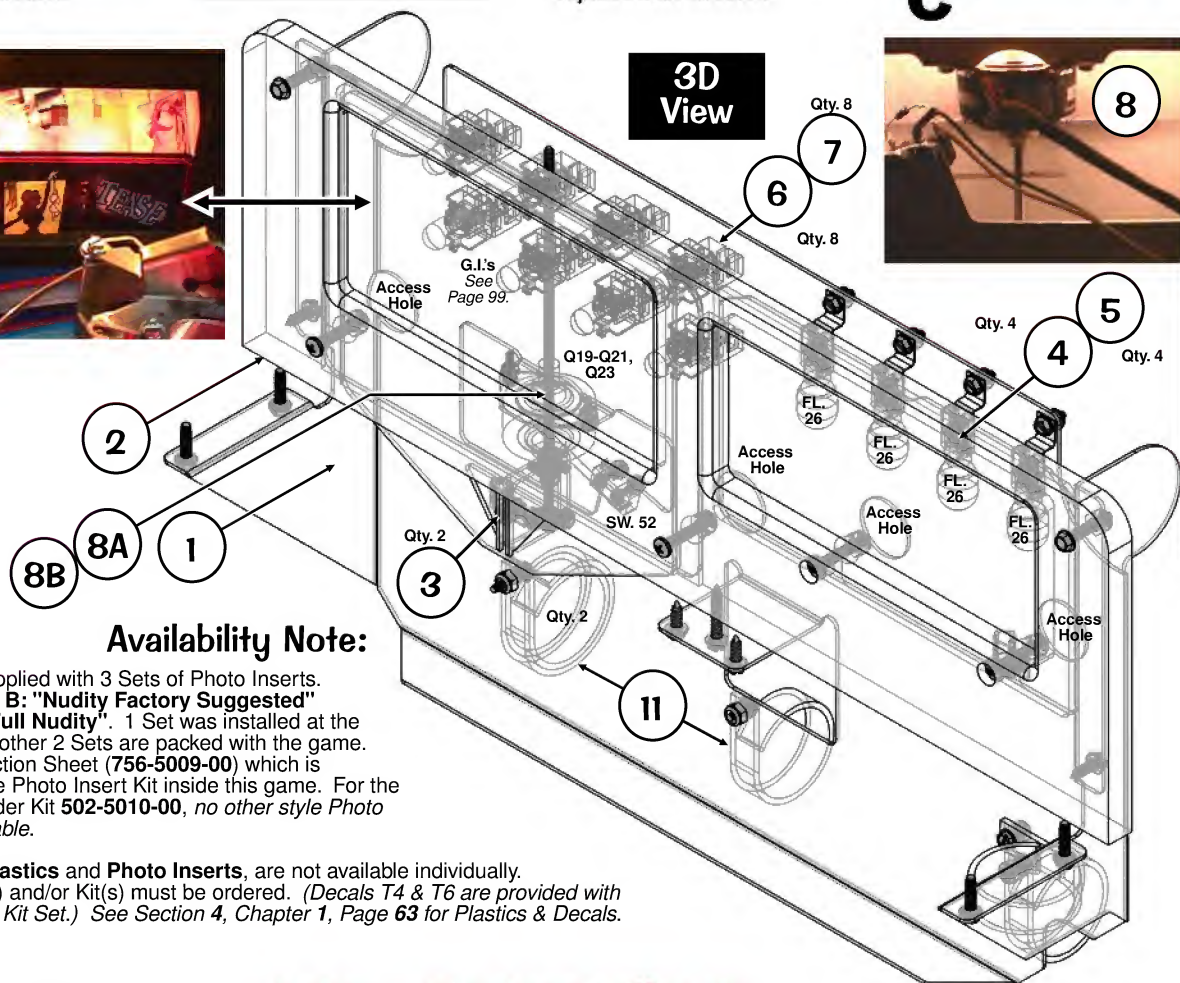
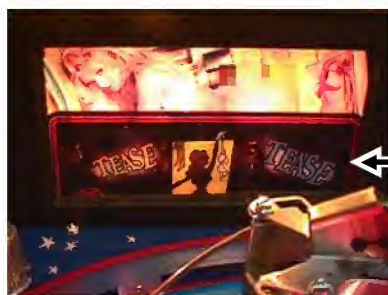
18 T9's

17 T8's



Pull the Playfield forward and rest the brackets at the front of the cabinet to hold steady. Pull the Photo Insert out from the top and replace with another.

Pull the Playfield forward and rest the brackets at the front of the cabinet to hold steady. Pull the Photo Insert out from the top and replace with another.



Availability Note:

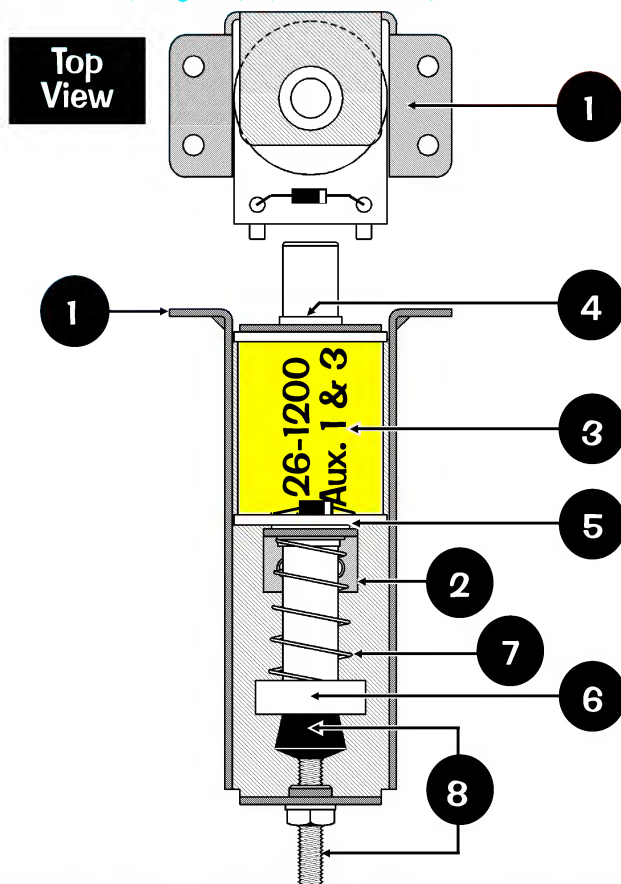
This game is supplied with 3 Sets of Photo Inserts.
A: "No Nudity", B: "Nudity Factory Suggested"
 and **C: "Some Full Nudity"**. 1 Set was installed at the Factory and the other 2 Sets are packed with the game.
 Read the Instruction Sheet (756-5009-00) which is provided with the Photo Insert Kit inside this game. For the same 3 Sets, order Kit 502-5010-00, no other style Photo inserts are available.

Items 14-18: Plastics and Photo Inserts, are not available individually. The entire Set(s) and/or Kit(s) must be ordered. (Decals T4 & T6 are provided with the Photo Insert Kit Set.) See Section 4, Chapter 1, Page 63 for Plastics & Decals.

UK ONLY OPTIONAL Ball Deflector Assemblies, 500-5788-02 (Qty. 2) (Items 1-8)

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Ball Deflector Coil Mounting Bracket	1	535-6857-02
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 4) (234-5101-00)			
2	Coil Retaining Bracket	1	535-5203-03
Item 2 is secured by: #8-32 X 1/4" PPH MS (Sems) Zinc (Qty. 2) (232-5300-00)			
3	Coil, 26-1200	1	090-5044-00T
ORDERING ABOVE (ITEM 3) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
4	Coil Sleeve (Short) (Formost #10-7077)	1	545-5076-01
5	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
6	Solid Plunger Assembly	1	515-6858-00
7	Compression (Relay) Spring	1	266-5022-01
8	#10-32 Adj. Spindle Stop w/Rubber Tip	1	280-5014-00
Item 8 is secured by: #10-32 Keps Nut (Qty. 1) (240-5208-00)			

Ordering Note: If 500-5788-02 is unavailable, order the individual part(s) actually required.



UK ONLY OPTIONAL Up/Down Post Assembly, 500-6293-00 (Items 1-9)

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Up/Down Post Coil Mounting Bracket	1	515-6840-00
Item 1 is secured below the playfield by: #8 X 1/2" HWH AB (Zinc) (Qty. 6) (234-5101-00)			
2	Adjustment Spindle Stop Bracket	1	535-8303-00
3	Coil Retaining Bracket	2	535-7356-00
Items 2 & 3 are secured by: #8-32 X 3/8" Swage (Serr) Zinc (Qty. 2/per) (237-5975-00)			
4	Coil, 23-1100 (ORG)	1	090-5030-00T
ORDERING ABOVE (ITEM 4) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
5	Coil Sleeve (with extension)	1	545-5847-00
6	Spring Washer, 17/32" ID X 3/4" X 1"	1	269-5002-00
7	Plunger & Shaft Assembly	1	515-6844-00
ORDERING ABOVE (ITEM 7) SUB-ASSY. PART Nº WILL INCLUDE:			
7A	Ball Bumper Plastic (Top) Red	1	550-5029-02
7B*	Roll Pin, 3/32" ø X 1/2" Long	1	251-5002-00
7C*	Retaining Ring, 1/4" ø Shaft	1	270-5002-00
7D	Plunger & Shaft Sub-Assembly	1	515-6841-00
7E	Plunger Head	1	530-5511-00
7F	#10-32 X 3/8" PPH MS (Sems) Zinc	1	232-5401-00

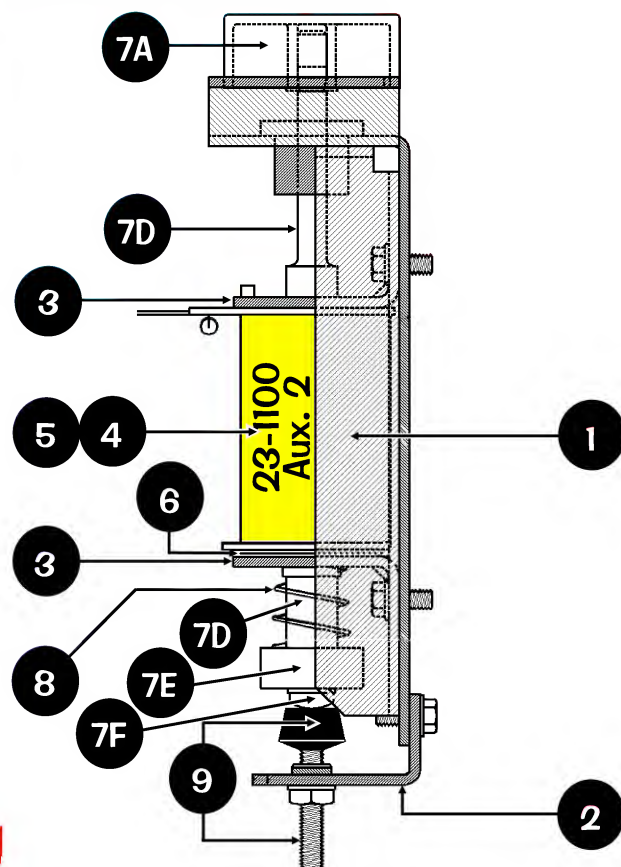
Ordering Note: If 515-6844-00 is unavailable, order the individual part(s) actually required. Item 7D, part of item 7, Plunger & Shaft Sub-Assembly, is 1 piece and cannot be ordered separated.

8	Compression (Relay) Spring	1	266-5022-01
9	#10-32 Adj. Spindle Stop w/Rubber Tip	1	280-5014-00
Item 9 is secured by: #10-32 Keps Nut (Qty. 1) (240-5208-00)			

Ordering Note: If 500-6293-00 is unavailable, order the individual part(s) actually required.

Take Note:

* An asterisk (*) indicates item(s) are not noted in the pictorials.



Playboy Flipper Part Updates

If your Playboy Pinball Game has Flippers which match the ones shown on Pages 74-75 in this Game Manual, the following replacement parts are required (review the following additional pages with the new Flippers):

For entire Flippers:

Replace **500-5944-14** with **500-6543-14** (Left)

Replace **500-5944-04** with **500-6543-04** (Right)

For individual parts:

Replace **Item 2**, Flipper Bat Bushing (White Plastic), **545-5594-00** with **new Item 2**, Flipper Bat Bushing (White Plastic), **545-5070-00***

** Note: The new plastic bushing has notch cut-outs and is slightly shorter in height on the bottom shaft end.*

Replace **Item 12**, Plunger, Link & Pawl (Left), **515-6518-01** with **new Item FRP 2**, Plunger, Link & Crank (Left) Assembly, **515-7203-01**

Replace **Item 12**, Plunger, Link & Pawl (Right), **515-6518-00** with **new Item FRP2**, Plunger, Link & Crank (Right) Assembly, **515-7203-00†**

*† Note: Use **FRP2** to replace the entire assembled parts of 515-6518-00.*

Replace **Item 12A**, Flipper Plunger/Link Sub-Assy., **515-6304-01** with **new Item 12**, Flipper Plunger & Link Sub-Assy., **515-6304-03****

*** Note: The new sub-assembly contains the new Plunger "Flipper" Link (old 545-5611-00, new 545-5611-01).*

Replace **Item 12B**, Pawl (Mntg. Link) (Left) Sub-Assy., **515-6305-01** with **new Item 13**, Crank Bar, **530-5070-02***** **and new Item 14**, Switch Actuator (LEFT) Sub-Assy., **515-7257-01*****

**** Note: The new Crank Bar 530-5070-02 replaces the old Pawl (Left) 535-7271-01 contained in 515-6305-01.*

Replace **Item 12B**, Pawl (Mntg. Link) (Right) Sub-Assy., **515-6305-00** with **new Item 13**, Crank Bar, **530-5070-02***** **and new Item 14**, Switch Actuator (RIGHT) Sub-Assy., **515-7257-00*****

**** Note: The new Crank Bar 530-5070-02 replaces the old Pawl (Right) 535-7271-00 contained in 515-6305-00.*

Item 12C, Return Bracket, **535-7353-00** **is no longer required** as the new replacement is a part of the **new Item 14 (535-9038-00 for Right and 535-9038-01 for Left)**.

Replace **Item 12D**, Flipper Link Bushing, **530-5139-01** with shorter Bushing, **530-5139-00**, *used with Item 13 Crank Bar where the Set Screw joins it with the Flipper Link.*

Item 12E, #10-32 X 1-1/4" Lg. Socket Head (Set Screw), **237-5950-01** **is no longer required.**

Item 12I, Washer, **242-5039-01** **is no longer required.**

Item 12J, Washer, **242-5038-00** **is no longer required.**

Item 12F, #10-32 X 7/8" Lg. Socket Hd (Set Screw), **237-5966-00** is **now a quantity of 2.**

All other flipper parts (and kits) are identical and can use the same part numbers.

Order the following **Flipper Rebuild Parts** for **Easier Installation and \$ave \$:**

When new parts for your **500-5944-14 Left Flipper** become necessary,
order the **Flipper (Left) Rebuild Kit, 500-6307-10**, which includes **Item 6, 10, 12, 13, 14 & 15**
of the new Left Flipper, **500-6543-14.**

When new parts for your **500-5944-04 Right Flipper** become necessary,
order the **Flipper (Right) Rebuild Kit, 500-6307-00**, which includes **Item 6, 10, 12, 13, 14 & 15**
of the new Right Flipper, **500-6543-04.**

Any questions, please call Technical Support at **1-800-542-5377** or eMail us at **parts.service@sternpinball.com**

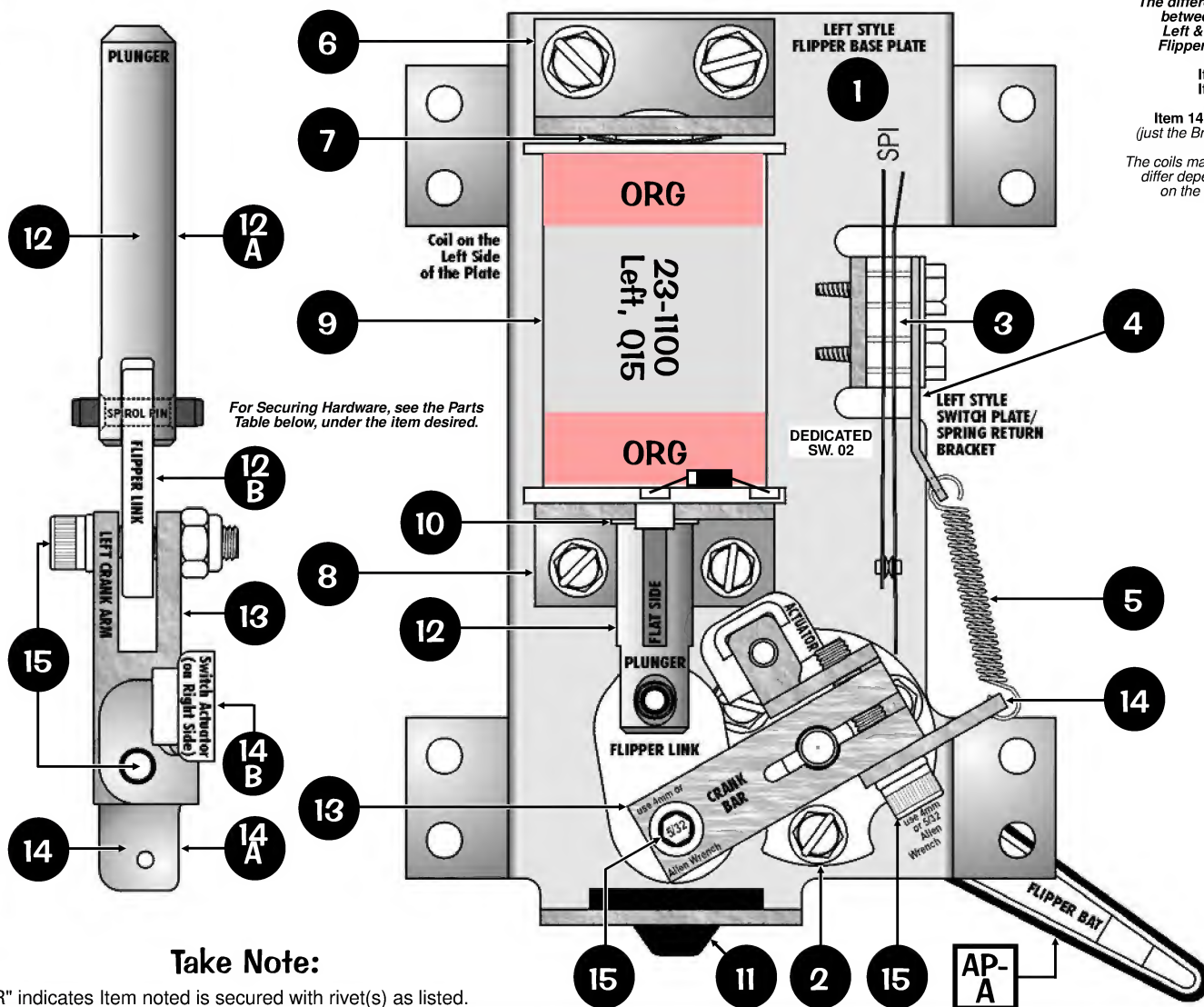
Flipper (Left) Assembly, 500-6543-14 (Items 1-15) and Associated Part: White Flipper Bat & Shaft Assy., 515-5133-08-06 (Item AP-A)

The differences between the Left & Right Flippers are:

Item 1, Item 4, and Item 14 (14A) (just the Bracket)

The coils may also differ depending on the game.

* To Order the Flipper (Left) Rebuild Kit ask for Part Nr.: 500-6307-10 (includes Items 6, 10, 12, 13, 14 & 15)



Take Note:

® "R" indicates Item noted is secured with rivet(s) as listed.

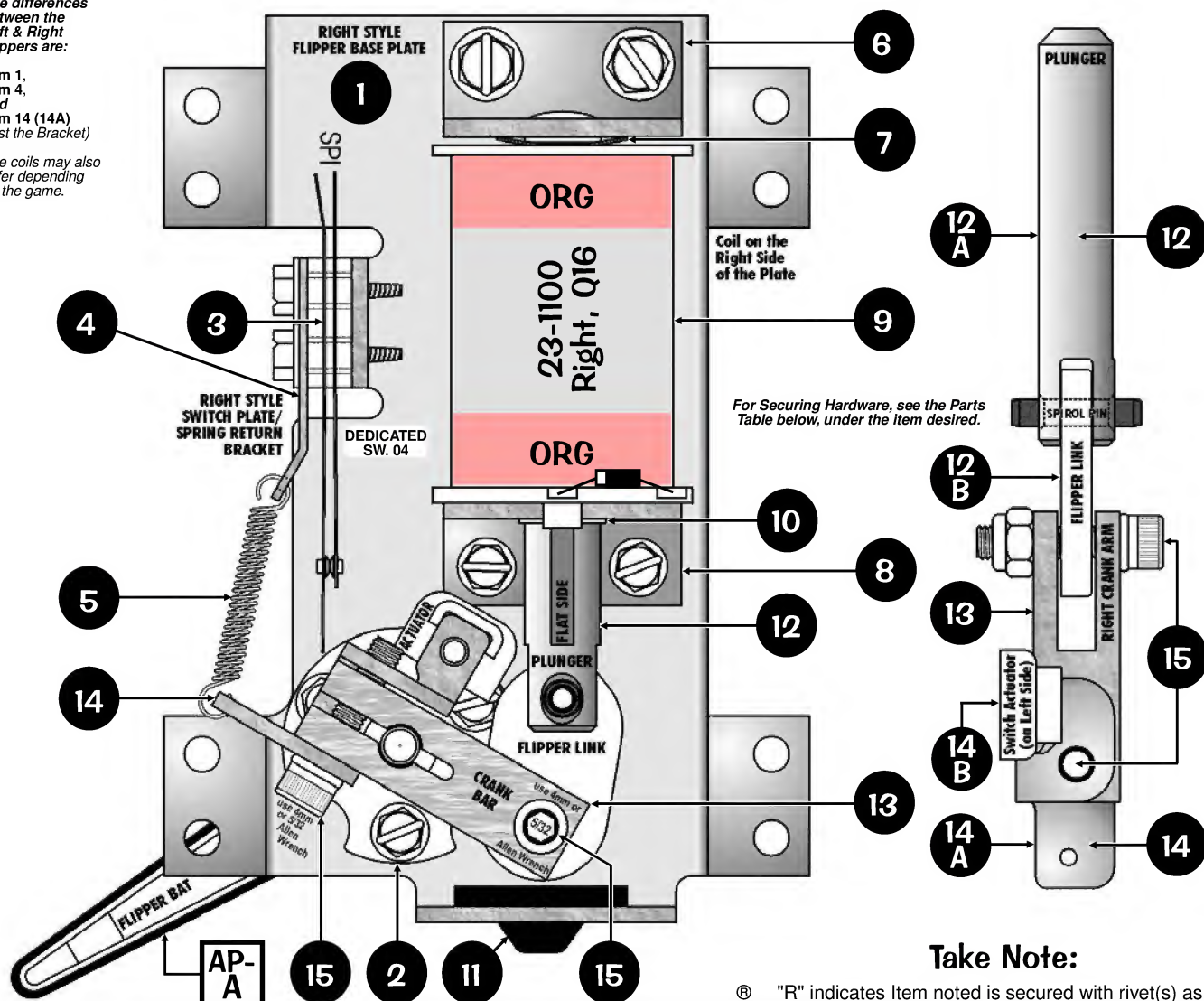
Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº	Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Flipper Base Plate (LEFT)	1	See FRP1	13*	Crank Bar	1	530-5070-02
Item 1 is secured below the playfield by: #10 X 1/2" HWH MS (Serr) Zinc ST (Qty. 8) (237-5949-00) Ordering Note: Use Item FRP1, see the end of this Parts Table.				Item 13 requires: Bushing, .192" ø ID X .312" ø OD X .195" (Qty. 1) (530-5139-00)			
2	Flipper Bat Bushing (White Plastic)	1	545-5070-00	14*	® Switch Actuator (LEFT) Sub-Assy.	1	515-7257-01
Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)				ORDERING ABOVE (ITEM 14) SUB-ASSY. PART Nº WILL INCLUDE:			
3	Power (End of Stroke) Switch	1	180-5149-00	14A	Actuator & Spring Bracket (LEFT)	1	535-9038-01
Item 3 is secured to Item 1 by: #6-32 X 5/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-04)				14B	® Switch Actuator (White Plastic)	1	545-5612-00
4	Sw. Plate/Spring Return Brkt. (LEFT)	1	535-7354-01	Item 14B is secured to 14A by: Rivet, 1/8" ø X 1/4" Lg. (Qty. 1) (249-5003-00)			
5	Flipper Return Spring	1	265-5035-00	15*	Set Screw: #10-32 X 7/8" Socket Hd.	2	237-5966-00
6*	Coil Stop Bracket Sub-Assembly	1	515-6308-01	Item 15 requires: #10 Split Lock Washer (Qty. 1/per) (244-5003-00) and #10-32 Nylon Stop Nut (Qty. 1/per) (240-5203-00) Tool Required for Item 15: 5/32" or 4mm Allen Wrench			
Item 6 is secured to Item 1 by: #10-32 X 3/8" SHWH Swage (Serr) Zinc (Qty. 2) (237-5985-00) and #10 Split Lock Washer (Qty. 2) (244-5003-00)				Flipper Rebuild Parts for Easier Installation, Save \$:			
7	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00	Flipper Base Plate Kit (LEFT)			
8	Coil Support Bracket	1	535-7356-00	FRP1 Includes Item 1 pre-threaded, with the Securing Hardware for Items 2, 3, 6 & 8.			
Item 8 is secured to Item 1 by: #8-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)				FRP2 Plunger, Link & Crank (LEFT) Assy. Includes above Items 12, 13, 14 and 15 and is pre-assembled.			
9	Coil, 23-1100 (ORANGE) (Left)	1	090-5030-00T	FRP3 Flipper (LEFT) Rebuild Kit Same as FRP2, but also includes above Items 6 & 10.			
ORDERING ABOVE (ITEM 9) COIL PART Nº WILL INCLUDE:				ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00	Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
10*	Coil Sleeve	1	545-5388-00	AP-A	WHITE Flipper Bat & Shaft (Plain) (Non-Knurled End) Assembly	1	515-5133-08-06
11	Deflector Pad (Bumper)	1	545-5428-00		Large Flipper BLACK Rubber Ring	1	545-5277-00
12*	Flipper Plunger & Link Sub-Assy.	1	515-6304-03				
ORDERING ABOVE (ITEM 12) SUB-ASSY. PART Nº WILL INCLUDE:							
12A	Flipper Plunger with "Flat"	1	530-5349-01				
12B	Plunger "Flipper" Link	1	545-5611-01				
Item 12B is secured to 12A by: Bushing, .16" ø ID X .281" ø OD X .187" (Qty. 1) (530-5532-00) and Spirol Pin ø 5/32" X 3/4" Lg. (Qty. 1) (251-5015-02)							

Flipper (Right) Assembly, 500-6543-04 (Items 1-15) and Associated Part: White Flipper Bat & Shaft Assy., 515-5133-08-06 (Item AP-A)

The differences between the Left & Right Flippers are:

Item 1, Item 4, and Item 14 (14A) (just the Bracket)

The coils may also differ depending on the game.



* To Order the Flipper (Right) Rebuild Kit ask for Part Nr.: 500-6307-00 (includes Items 6, 10, 12, 13, 14 & 15)

Take Note:

® "R" indicates Item noted is secured with rivet(s) as listed.

Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
1	Flipper Base Plate (RIGHT)	1	See FRP1
Item 1 is secured below the playfield by: #10 X 1/2" HWH MS (Serr) Zinc ST (Qty. 8) (237-5949-00) Ordering Note: Use Item FRP1, see the end of this Parts Table.			
2	Flipper Bat Bushing (White Plastic)	1	545-5070-00
Item 2 is secured to Item 1 by: #6-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 3) (237-5976-02)			
3	Power (End of Stroke) Switch	1	180-5149-00
Item 3 is secured to Item 1 by: #6-32 X 5/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5976-04)			
4	Sw. Plate/Spring Return Brkt. (RIGHT)	1	535-7354-00
5	Flipper Return Spring	1	265-5035-00
6*	Coil Stop Bracket Sub-Assembly	1	515-6308-01
Item 6 is secured to Item 1 by: #10-32 X 3/8" SHWH Swage (Serr) Zinc (Qty. 2) (237-5985-00) and #10 Split Lock Washer (Qty. 2) (244-5003-00)			
7	Spring Washer (17/32" ID X 3/4" X 1")	1	269-5002-00
8	Coil Support Bracket	1	535-7356-00
Item 8 is secured to Item 1 by: #8-32 X 3/8" HWH Swage (Ser.) Zc. (Qty. 2) (237-5975-00)			
9	Coil, 23-1100 (ORANGE) (Right)	1	090-5030-00T
ORDERING ABOVE (ITEM 9) COIL PART Nº WILL INCLUDE:			
—	Diode, 1N4004 (positioned at top)	1	112-5003-00
10*	Coil Sleeve	1	545-5388-00
11	Deflector Pad (Bumper)	1	545-5428-00
12*	Flipper Plunger & Link Sub-Assy.	1	515-6304-03
ORDERING ABOVE (ITEM 12) SUB-ASSY. PART Nº WILL INCLUDE:			
12A	Flipper Plunger with "Flat"	1	530-5349-01
12B	Plunger "Flipper" Link	1	545-5611-01
Item 12B is secured to 12A by: Bushing, .16" ø ID X .281" ø OD X .187" (Qty. 1) (530-5532-00) and Spirol Pin ø 5/32" X 3/4" Lg. (Qty. 1) (251-5015-02)			

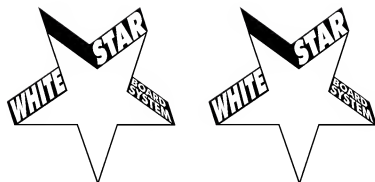
Nº	INDIVIDUAL PART NAME	QTY.	SPI PART Nº
13*	Crank Bar	1	530-5070-02
Item 13 requires: Bushing, .192" ø ID X .312" ø OD X .195" (Qty. 1) (530-5139-00)			
14*	® Switch Actuator (RIGHT) Sub-Assy.	1	515-7257-00
ORDERING ABOVE (ITEM 14) SUB-ASSY. PART Nº WILL INCLUDE:			
14A	Actuator & Spring Bracket (RIGHT)	1	535-9038-00
14B	® Switch Actuator (White Plastic)	1	545-5612-00
Item 14B is secured to 14A by: Rivet, 1/8" ø X 1/4" Lg. (Qty. 1) (249-5003-00)			
15*	Set Screw: #10-32 X 7/8" Socket Hd.	2	237-5966-00
Item 15 requires: #10 Split Lock Washer (Qty. 1/per) (244-5003-00) and #10-32 Nylon Stop Nut (Qty. 1/per) (240-5203-00) Tool Required for Item 15: 5/32" or 4mm Allen Wrench			

Flipper Rebuild Parts for Easier Installation, \$ave \$:

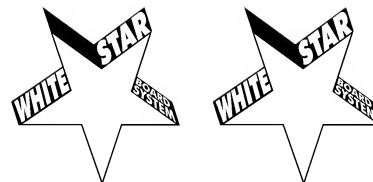
FRP1	Flipper Base Plate Kit (RIGHT) Includes Item 1 pre-threaded, with the Securing Hardware for Items 2, 3, 6 & 8.	515-6617-00
FRP2	Plunger, Link & Crank (RIGHT) Assy. Includes above Items 12, 13, 14 and 15 and is pre-assembled.	515-7203-00
FRP3	Flipper (RIGHT) Rebuild Kit Same as FRP2, but also includes above Items 6 & 10.	500-6307-00

ASSOCIATED PARTS ARE NOT INCLUDED WITH THE ABOVE ASSEMBLY.

Nº	ASSOCIATED PART NAME	QTY.	SPI PART Nº
AP-A	WHITE Flipper Bat & Shaft (Plain) (Non-Knurled End) Assembly	1	515-5133-08-06
	Large Flipper BLACK Rubber Ring	1	545-5277-00



Section 5 Schematics & Troubleshooting Table of Contents



☐	COILS DETAILED CHART TABLE	96
•	Chapter 1, Backbox Wiring	97
■	Backbox I/O Power Driver Board Detailed Wiring Diagram	97
■	Backbox Board Layout Wiring Diagram	98
•	Chapter 2, Playfield Wiring.....	99
■	General Illumination Circuit Detailed Wiring Diagram	99
☐	Playfield Switch Wiring Diagram & Playfield Lamp Wiring Diagram	100
■	Playfield Terminal Strips, Fuses & Misc. Wiring Descriptions & Locations	101
☐	2-Flipper Circuit Wiring Diagram	102
•	Chapter 3, Cabinet Wiring.....	103
■	Transformer Power Wiring Diagram	103
☐	Cabinet / Coin Door Wiring Diagram	104
•	Chapter 4, Printed Circuit Boards (PCBs)	105
■	Trough Up-Kicker Dual OPTO Boards Theory of Operation & Schematic, Component Layout & Parts	105
☐	OPTO Troubleshooting	(Top) 106
☐	Trough Dual OPTO Boards Alignment / Tests for LED1 & LED2.....	106-107
■	Dot Matrix Display/Display Controller Bd. Combined Display Connections	108
☐	Display Power Supply Board Schematic, Component Layout & Parts	109
■	Display Controller Board Schematic	110-111
■	Display Controller Board Component Layout & Parts	112
☐	I/O Power Driver Board Theory of Operation	113
☐	I/O Power Driver Board Schematic (Sheet 1 of 5), (Sheet 2 of 5), (Sheet 3 of 5), (Sheet 4 of 5), (Sheet 5 of 5)	114-123
☐	I/O Power Driver Board Component Layout	124
☐	I/O Power Driver Board Parts	125
■	CPU/Sound Board Theory of Operation	127
■	CPU/Sound Board Schematic (Sheet 1 of 3), (Sheet 2 of 3), (Sheet 3 of 3)	128-133
■	CPU/Sound Board Component Layout.....	134
■	CPU/Sound Board Parts	135
☐	(UK Only) Solenoid Expander PC Board Schematic, Component Layout & Parts	136

Visit www.StemPinball.com/schematics.htm for the latest 11" X 17" Schematics (or "Split 8-1/2" X 11") for the Display Power Supply, Display Controller, I/O Power Driver & CPU/Sound Boards (White Star® System Only). Along with the schematics you will find the component layout and theory of operation. Keep visiting as these files are updated frequently. To download the schematics you can utilize internal links where addresses may direct you to another sheet in the schematic set (further instructions within documents). To "download" once open, in your browser click "File" "Save" "Page by eMail". It will be sent to your eMail Address, where there you can save the file to your hardrive.

Use the below **Coils Detailed Chart Table** in conjunction with *Sec. 5, Chp. 1, Backbox I/O Power Driver Board Detailed Wiring Diagram (I/O Board Connectors J6, J7, J8 & J9) and Backbox Board Layout Wiring Diagram:*

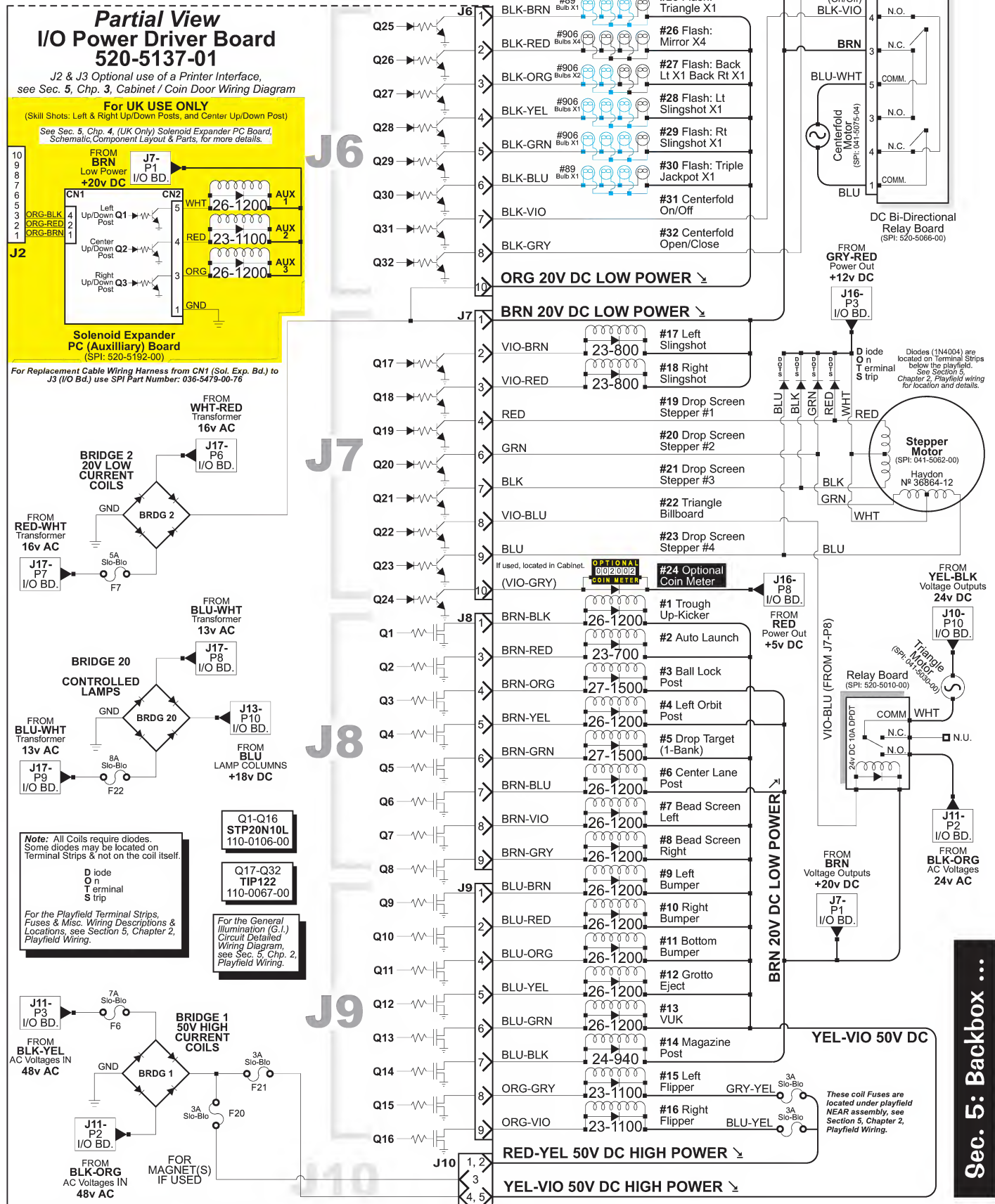
COILS DETAILED CHART TABLE

High Current Coils Group 1		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn or Bulb Type
#1	TROUGH UP-KICKER	Q1	I/O Pwr. Drvr.	BRN-BLK	J8-P1	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#2	AUTO LAUNCH	Q2	I/O Pwr. Drvr.	BRN-RED	J8-P3	YEL-VIO	J10-P4/5	50v DC	23-700 090-5022-00T
#3	BALL LOCK POST	Q3	I/O Pwr. Drvr.	BRN-ORG	J8-P4	BRN	J7-P1	20v DC	27-1500 090-5004-00T
#4	LEFT ORBIT POST	Q4	I/O Pwr. Drvr.	BRN-YEL	J8-P5	BRN	J7-P1	20v DC	26-1200 090-5044-00T
#5	DROP TARGET	Q5	I/O Pwr. Drvr.	BRN-GRN	J8-P6	YEL-VIO	J10-P4/5	50v DC	27-1500 090-5004-00B
#6	CENTER LANE POST	Q6	I/O Pwr. Drvr.	BRN-BLU	J8-P7	BRN	J7-P1	20v DC	26-1200 090-5044-00T
#7	BEAD SCREEN LEFT	Q7	I/O Pwr. Drvr.	BRN-VIO	J8-P8	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#8	BEAD SCREEN RIGHT	Q8	I/O Pwr. Drvr.	BRN-GRY	J8-P9	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
High Current Coils Group 2		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn
#9	LEFT BUMPER	Q9	I/O Pwr. Drvr.	BLU-BRN	J9-P1	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#10	RIGHT BUMPER	Q10	I/O Pwr. Drvr.	BLU-RED	J9-P2	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#11	BOTTOM BUMPER	Q11	I/O Pwr. Drvr.	BLU-ORG	J9-P4	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#12	GROTTO EJECT	Q12	I/O Pwr. Drvr.	BLU-YEL	J9-P5	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#13	VUK	Q13	I/O Pwr. Drvr.	BLU-GRN	J9-P6	YEL-VIO	J10-P4/5	50v DC	26-1200 090-5044-00T
#14	MAGAZINE POST	Q14	I/O Pwr. Drvr.	BLU-BLK	J9-P7	BRN	J7-P1	20v DC	24-940 090-5036-00B
#15	LEFT FLIPPER (50v RED/YEL)	Q15	I/O Pwr. Drvr.	ORG-GRY	J9-P8	RED-YEL GRY-YEL	J10-P1/2	50v DC	23-1100 090-5030-00T
#16	RIGHT FLIPPER (50v RED/YEL)	Q16	I/O Pwr. Drvr.	ORG-VIO	J9-P9	RED-YEL BLU-YEL	J10-P1/2	50v DC	23-1100 090-5030-00T
Low Current Coils Group 1		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn or Meter #
#17	LEFT SLINGSHOT	Q17	I/O Pwr. Drvr.	VIO-BRN	J7-P2	BRN	J7-P1	20v DC	23-800 090-5001-00T
#18	RIGHT SLINGSHOT	Q18	I/O Pwr. Drvr.	VIO-RED	J7-P3	BRN	J7-P1	20v DC	23-800 090-5001-00T
#19	DROP SCREEN STEPPER #1	Q19	I/O Pwr. Drvr.	RED	J7-P4	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#20	DROP SCREEN STEPPER #2	Q20	I/O Pwr. Drvr.	GRN	J7-P6	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#21	DROP SCREEN STEPPER #3	Q21	I/O Pwr. Drvr.	BLK	J7-P7	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#22	TRIANGLE BILLBOARD	Q22	I/O Pwr. Drvr.	VIO-BLU	J7-P8	BRN	J7-P1	20v DC	Relay Bd. 520-5010-00
#23	DROP SCREEN STEPPER #4	Q23	I/O Pwr. Drvr.	BLU	J7-P9	GRY-RED to WHT	J16-P3	20v DC	Stepr. Mtr. 041-5062-00
#24	OPTIONAL COIN METER	Q24	I/O Pwr. Drvr.	VIO-GRY	J7-P10	RED	J16-P7	5v DC	Meter 5v 091-5000-00
D iode O n T ermi n al S tri p (if noted)									
Low Current Coils Group 2		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Bulb Type
#25	FLASH: TRIANGLE X1	Q25	I/O Pwr. Drvr.	BLK-BRN	J6-P1	ORG	J6-P10	20v DC	#89 Bulb 165-5000-89
#26	FLASH: MIRROR X4	Q26	I/O Pwr. Drvr.	BLK-RED	J6-P2	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#27	FLASH: BACK LT X1 BACK RT X1	Q27	I/O Pwr. Drvr.	BLK-ORG	J6-P3	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#28	FLASH: LT SLINGSHOT X1	Q28	I/O Pwr. Drvr.	BLK-YEL	J6-P4	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#29	FLASH: RT SLINGSHOT X1	Q29	I/O Pwr. Drvr.	BLK-GRN	J6-P5	ORG	J6-P10	20v DC	#906 Bulb 165-5004-00
#30	FLASH: TRIPLE JACPOT X1	Q30	I/O Pwr. Drvr.	BLK-BLU	J6-P6	ORG	J6-P10	20v DC	#89 Bulb 165-5000-89
#31	CENTERFOLD ON/OFF	Q31	I/O Pwr. Drvr.	BLK-VIO	J6-P7	BRN	J7-P1	20v DC	DC Relay 520-5066-00
#32	CENTERFOLD OPEN/CLOSE	Q32	I/O Pwr. Drvr.	BLK-GRY	J6-P8	BRN	J7-P1	20v DC	(Motor) 041-5075-04
Note: In Test Flash Lamps Menu ("Flash" Icon), Flashers tested are all Flash Lamps located between Q1-Q32 (This Game: Q25-Q30)									
Auxilliary (UK ONLY)		Drive Trans-istor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA-Turn
AUX 1: LEFT UP/DOWN POST		Q1	Sol. Expander (Aux. Board)	WHT	CN2-P5	BRN	J7-P1	20v DC	26-1200 090-5044-00T
AUX 2: CENTER UP/DOWN POST		Q2	Sol. Expander (Aux. Board)	RED	CN2-P4	BRN	J7-P1	20v DC	23-1100 090-5030-00T
AUX 3: RIGHT UP/DOWN POST		Q3	Sol. Expander (Aux. Board)	ORG	CN2-P3	BRN	J7-P1	20v DC	26-1200 090-5044-00T



Backbox Wiring

Backbox I/O Power Driver Board Detailed Wiring Diagram



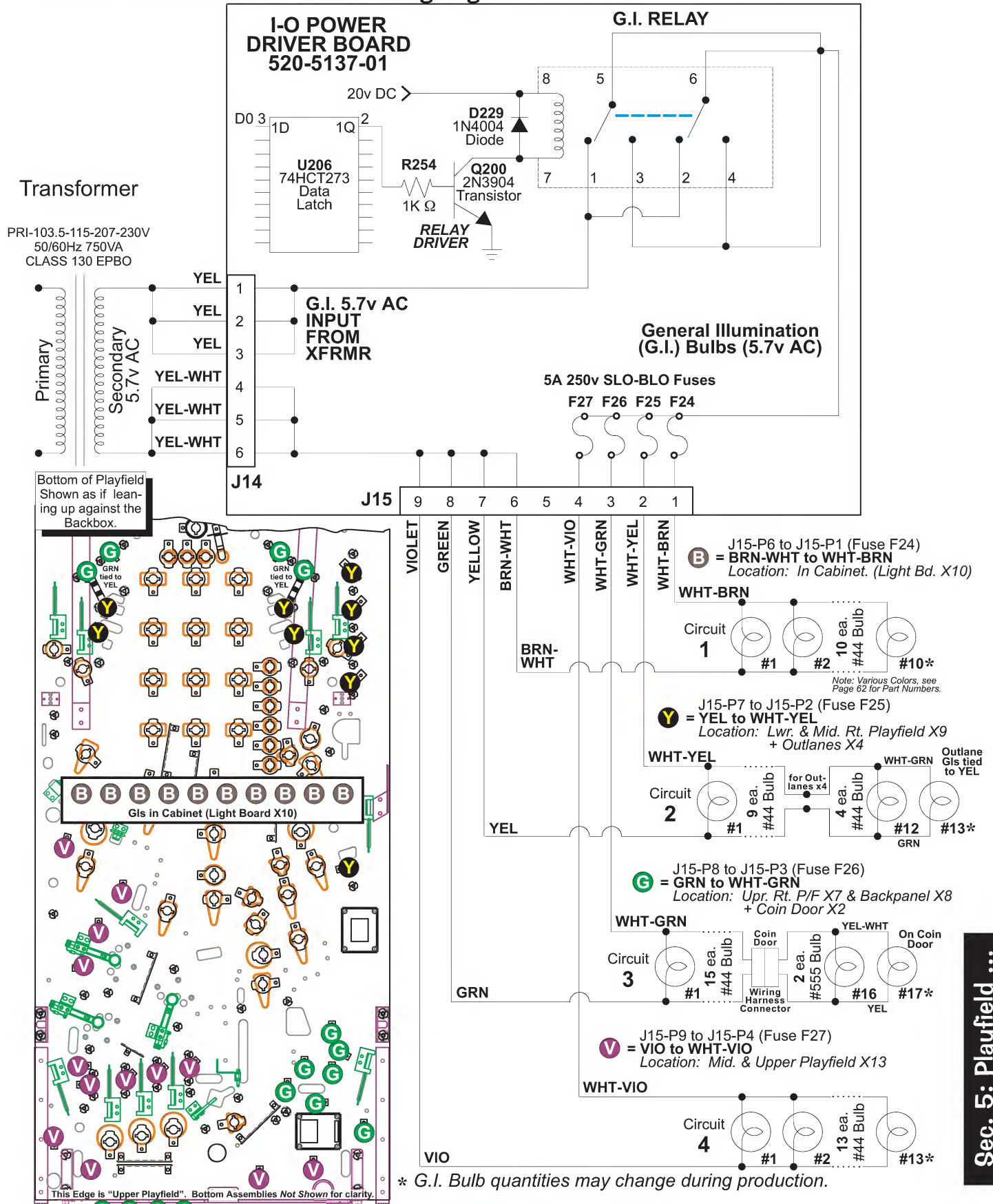
Sec. 5: Backbox ...

When connecting any Ribbon Cable, always ensure the "Red Line" side of the ribbon cable goes to the Pin-1 side of any Dual 0.1" Header Connector.



Playfield Wiring

General Illumination Circuit Detailed Wiring Diagram



Playfield Switch Wiring Diagram

Note: All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies.

For Switch(es): 26 & 35

Diode On Terminal Strip

Diode On Diode Board

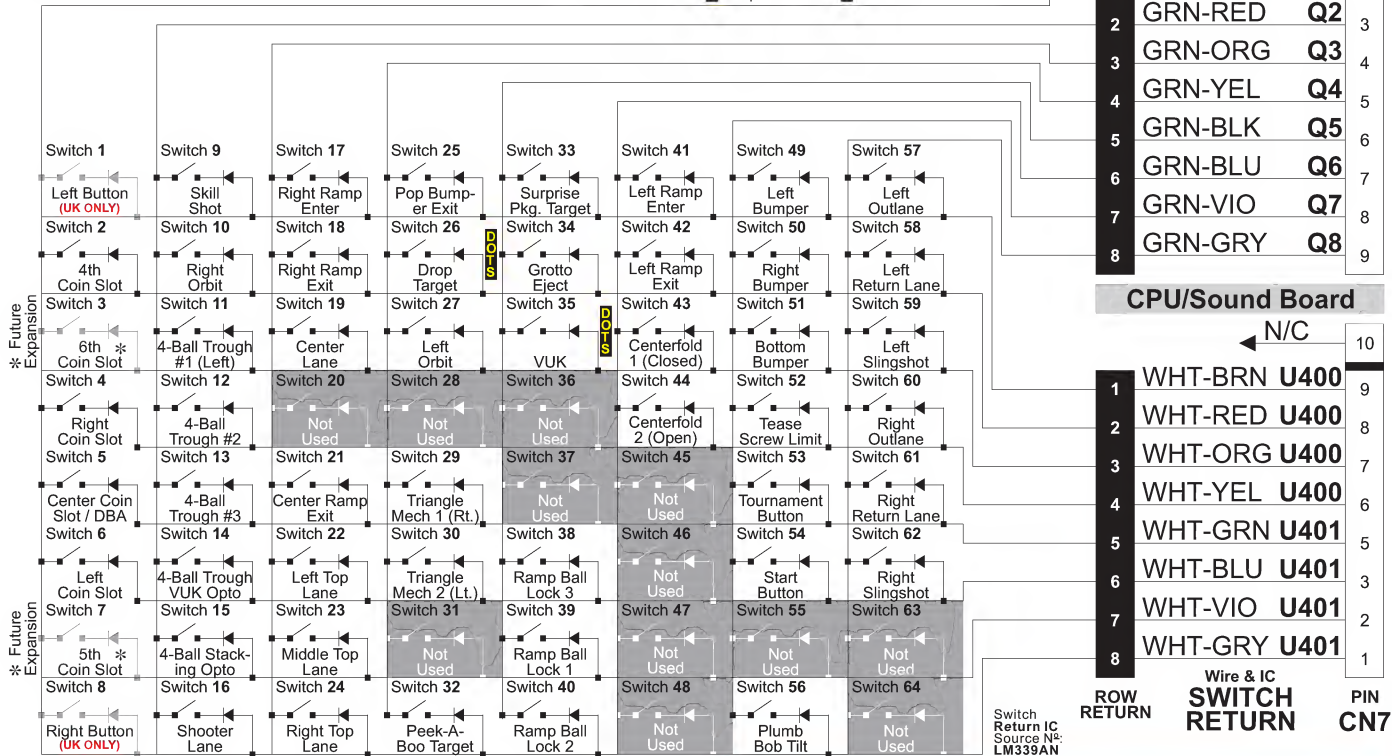
Switch Drive Transistor Source N^o: 2N3904

COLUMN DRIVE

SWITCH DRIVE

Wire & Transistor

CN5 PIN



Playfield Lamp Wiring Diagram

Note: All Switch, Lamp & Coil assemblies require diodes. Some diodes are located under the playfield on Terminal Strips or Diode Boards and not on the assemblies.

For Lamp(s): 56-57 & 73-79

Diode On Terminal Strip

Diode On Diode Board

J13-Pin 10 is Power Out for +18v DC to the Display Power Supply Bd at CN1-Pin 6

BLUE



Sec. 5: Playfield ...

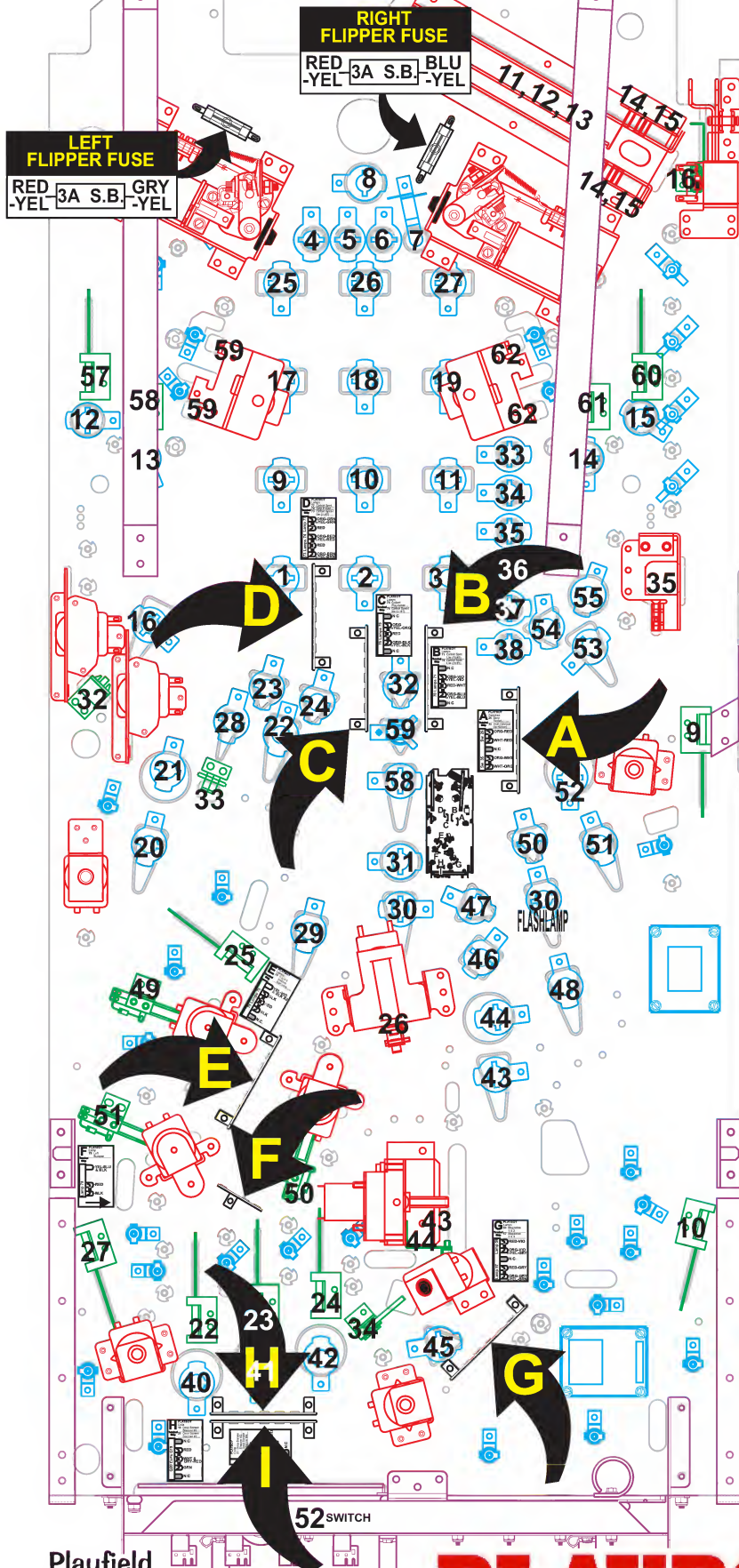


Playfield Terminal Strips, Fuses & Misc. Wiring Descriptions & Locations

Please Note: Terminal Strip(s), Diode Board(s) and/or Fuse Holder(s) locations shown, represent the general location (your game may differ slightly).

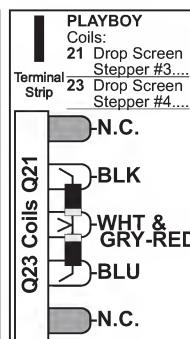
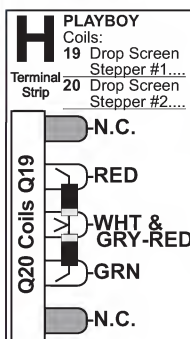
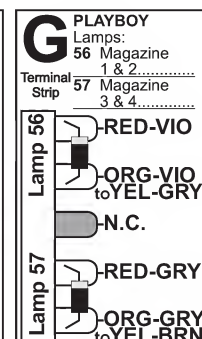
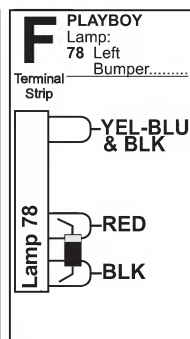
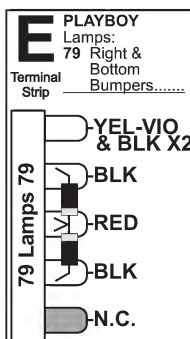
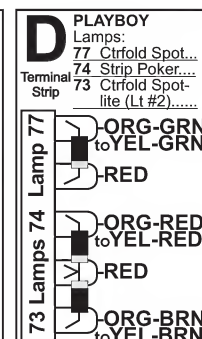
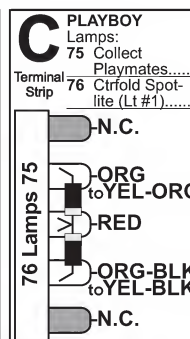
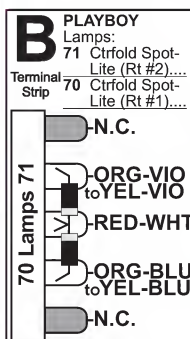
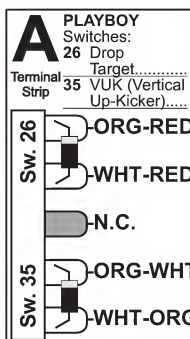
Bottom of Playfield
Shown as if lean-
ing up against the
Backbox.

All fuses are rated:
3A 250v Slo-Blo
Do Not Over-Fuse



Explanation:

All Switch, Lamp & Coil assemblies require diodes. Some diodes are **located under the playfield** on Terminal Strips **or** Diode Boards and not on the assemblies. The Switch and Lamp Matrix Grids also note which Switch or Lamp has a diode on a Terminal Strip (noted by **"DOTS"** meaning: **"Diode On Terminal Strip"**) or on a Diode Board (noted by **"DODB"** meaning: **"Diode On Diode Board"**).

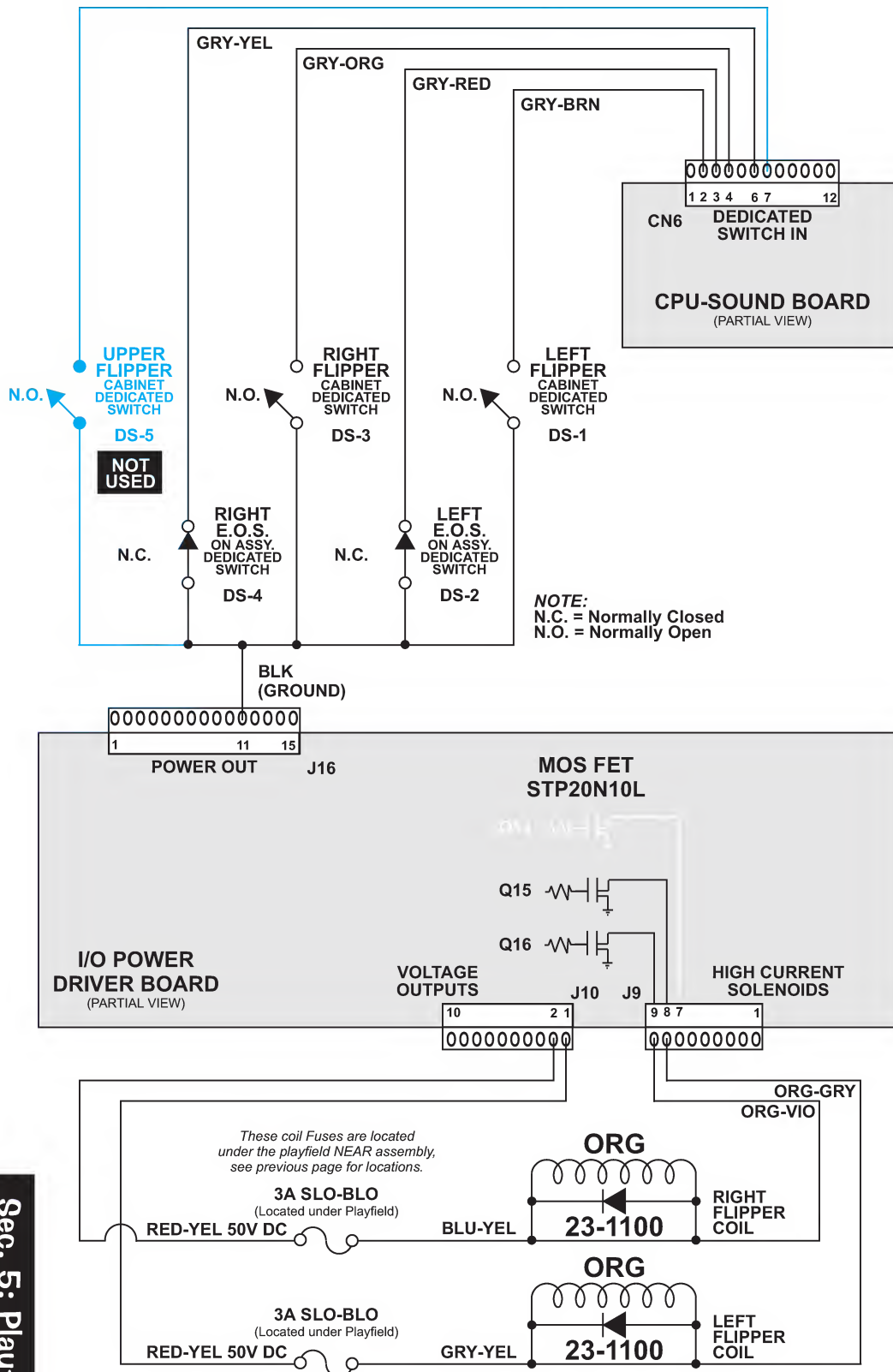


See the Pink Pages, Playfield - General
Parts (Below) (Pg. 60) for Terminal Strips,
Diodes, Fuses and Fuse Holders Part N's.

Sec. 5: Playfield ...

2-Flipper Circuit Wiring Diagram

The **White Star Board System™** has allowed us to *simplify* the *Flipper Circuit* to the point where we have *eliminated* the *Flipper Board* all together. The *Flipper Circuit* is now configured the same as any other Solenoid Drive Circuit.



Technical Overview

Our **Flipper System** uses one supply voltage (50v DC) for both **kick** & **hold**. Once the **Game CPU** detects a Flipper Cabinet Switch closure (during game play) it applies a 40msec pulse to the gate of the Flipper Drive Transistor (STP-20N10L). If it continues to detect a Flipper Cabinet Switch closure (*the player holding the button in*) it will continue to pulse the flipper drive transistor 1msec every 12msecs for the duration of the hold cycle.

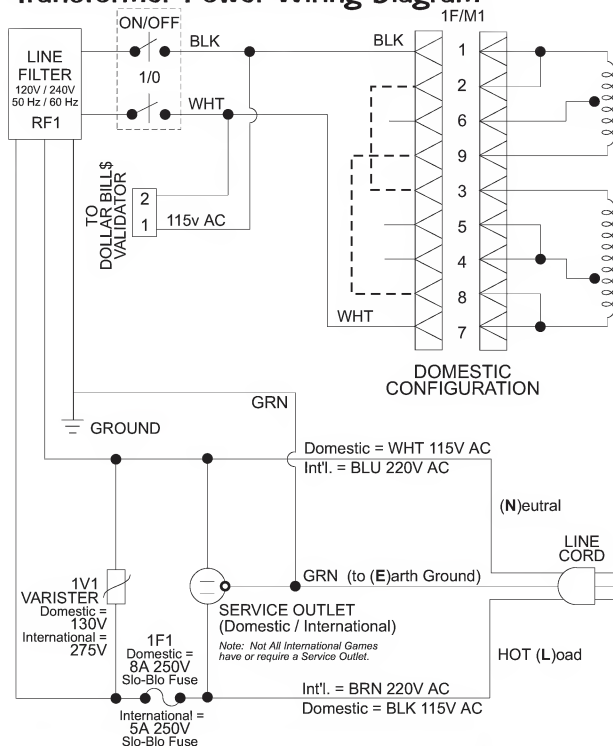
The **E.O.S.** (End-Of-Stroke) **Switch** serves the same function as before as it prevents foldback when the player has the flipper energized to capture balls. The **E.O.S. Switch** is a normally closed switch which opens approximately 1/16" when the flipper is energized. The **Game CPU** will detect a switch closure if the flipper bat is forced back by a high velocity shot or rebound on the playfield and will apply another 40msec pulse of 50v DC to the coil.

Note: If an Upper Flipper is used, the Flipper Button (on the same side of the cabinet as the Upper Flipper) will have a **"Double-Stacked" E.O.S. Switch**. This allows the player to push the Flipper Button either half-way down to energize only the Lower Flipper or pushing the Flipper Button all the way down to energize both the Lower & Upper Flippers.

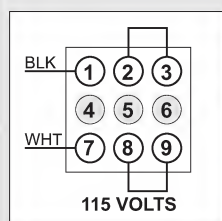


Cabinet Wiring

Transformer Power Wiring Diagram



JUMPERS FOR VOLTAGE VARIATION

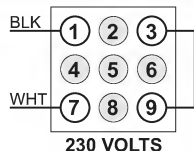
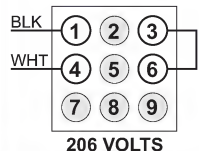


<<<<
CONFIGURATION FOR DOMESTIC 115V
>>>>

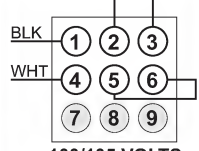
✓ **CONFIGURATION OF 220V OR LOWER LINE VOLTAGES FOR INTERNATIONAL USE** ✓

EXPORT/HIGH LINE VOLTAGE
230/218/206 VOLTS

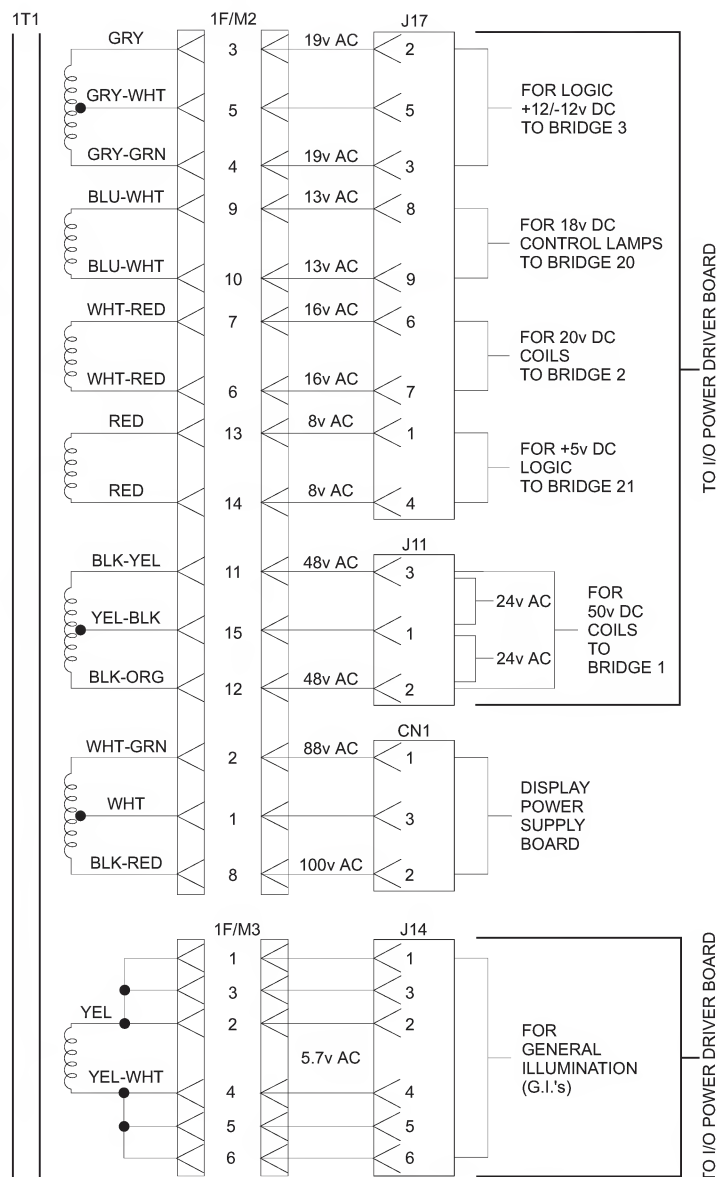
1F1= 5A 250V SLO BLO
1V1= 275V VARISTOR



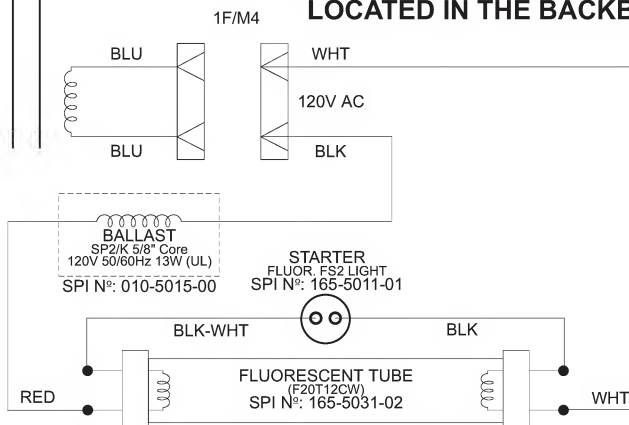
1F1= 8A SLO BLO
1V1= 130V VARISTOR



<<<<
CONFIGURATOR FOR JAPAN or LOW LINE VOLTAGE
>>>>



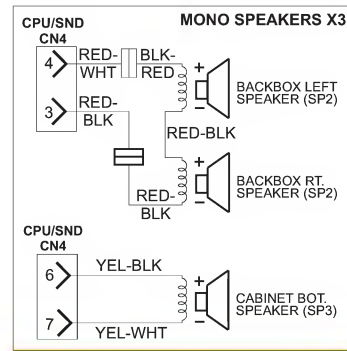
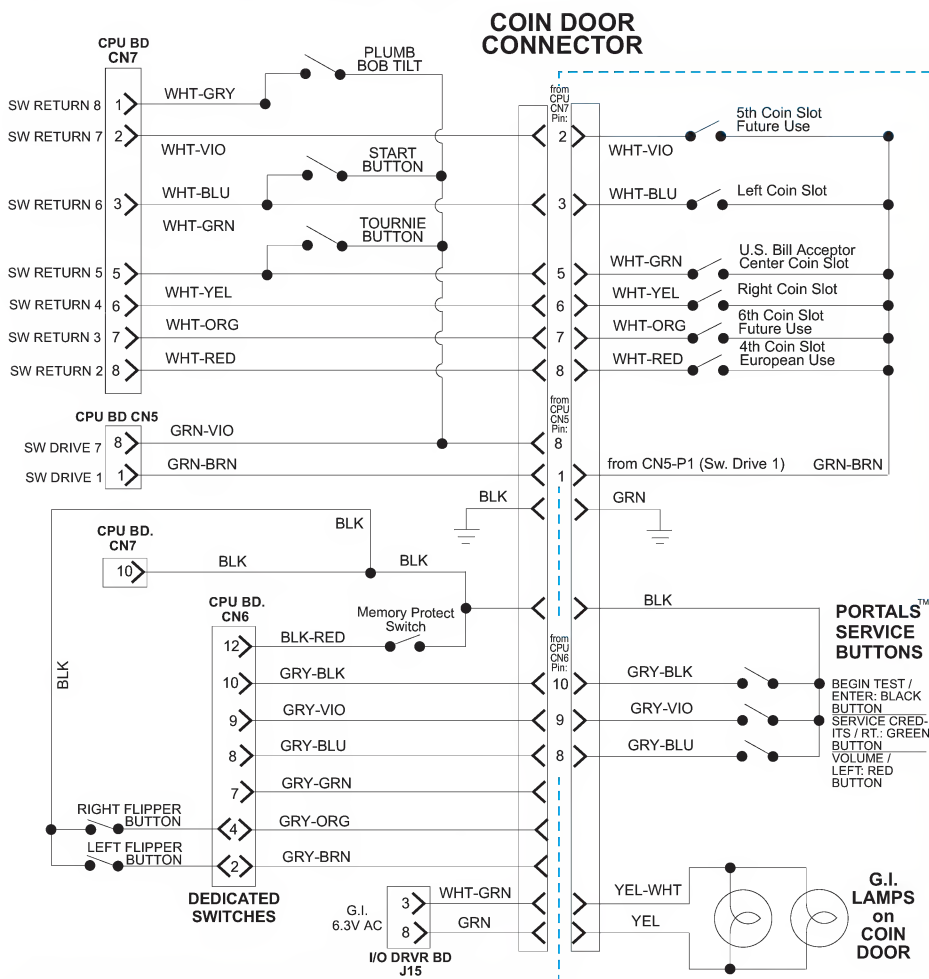
LOCATED IN THE BACKBOX



FLUORESCENT TUBE, STARTER & BALLAST IN THE BACKBOX

Sec. 5: Cabinet ...

Cabinet / Coin Door Wiring Diagram

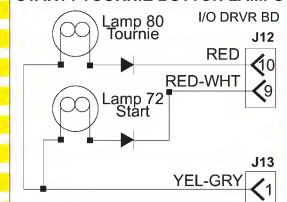
TO COIN METER

J16-7 +5VDC			
I/O DRVR BD	22	RED	<1
J7-10 Q24			
I/O DRVR BD	78	VIO-GRY	<2
	N/C		<3

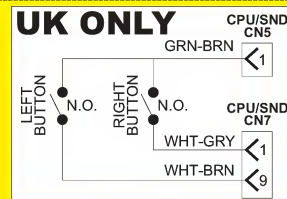
**FOR THE PRINTER
SUB-ASSEMBLY**

GROUND	00	BLK	<1
J16-7 +5VDC	22	RED	<2
I/O DRVR BD	82	GRY-RED	<3

START / TOURNIE BUTTON LAMPS



UK ONLY: 2 Extra Cabinet Buttons for the Post Save™ Feature are used. The Left Button operates the Left Outlane Ball Deflector. The Right Button operates the Right Outlane Ball Deflector. Both buttons pushed together, operate the Center Up/Down Post. Both buttons are located under the Flipper Buttons.



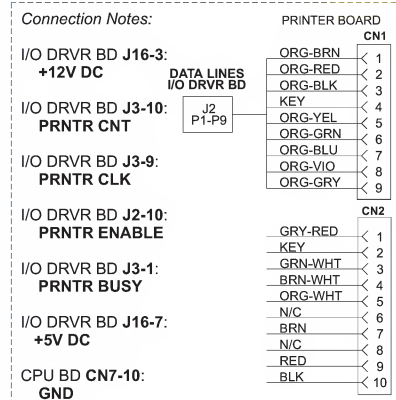
PRINTER INTERFACE OPTIONAL

Cable Wiring Harness SPI Part N°:

036-5408-00

RS-232 Printer Interface Board SPI Part N°:

520-5069-00



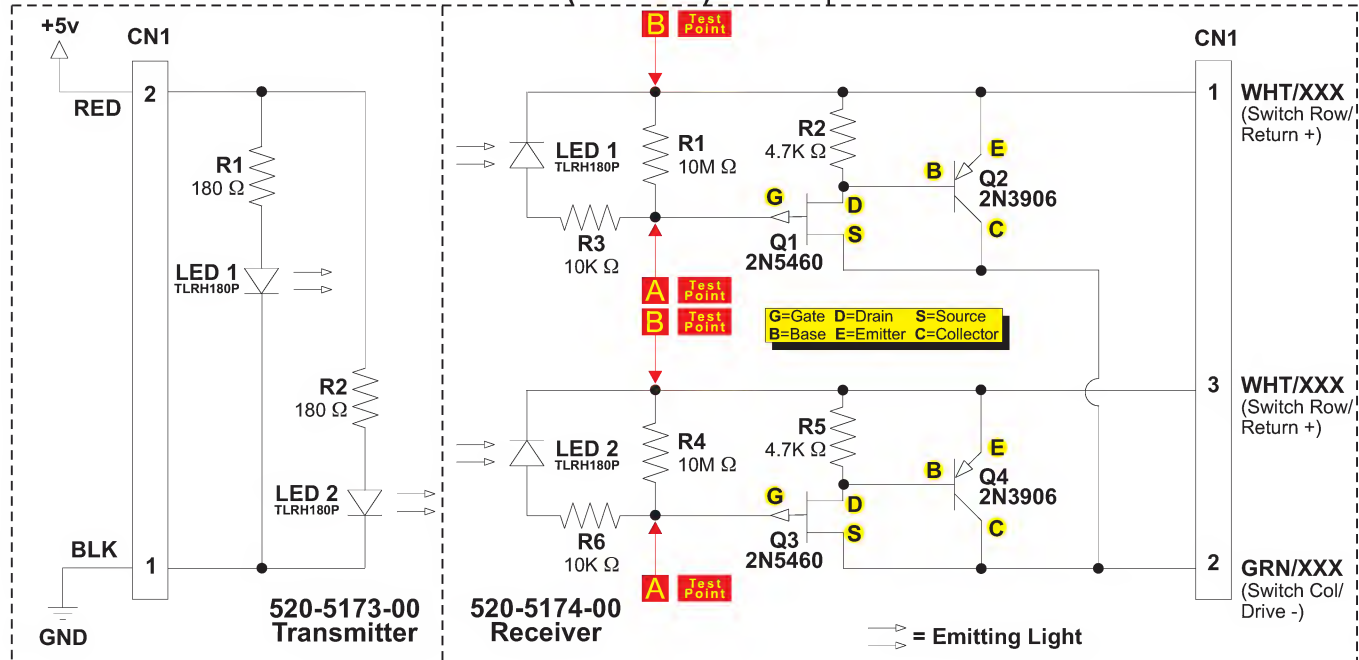
COIN DOOR



Printed Circuit Boards (PCBs)

Trough Up-Kicker Dual OPTO Boards Theory of Operation & Schematic

As light from the **Transmitter LED1** falls on the **Receiver LED1**, it generates a Positive Bias Voltage (0.7v to 1.5v) which is applied to the **Gate (G)** of **Q1 (Fet 2N5460)** turning **Q1** off. When **Q1** is held off, no current flows through **Q2's (2N3906) Base (B)**. With no base current, **Q2** is off and acts as an **OPEN SWITCH**. When the light is interrupted (**BLOCKED**) **R1** (Rec. Bd.) bleeds the gate voltage off of **Q1** allowing it to conduct, switching **Q2** on, which acts as a **CLOSED SWITCH**. The **LED2 (Trans/Rec) Circuit** operates identical as the **LED1 Circuit**.



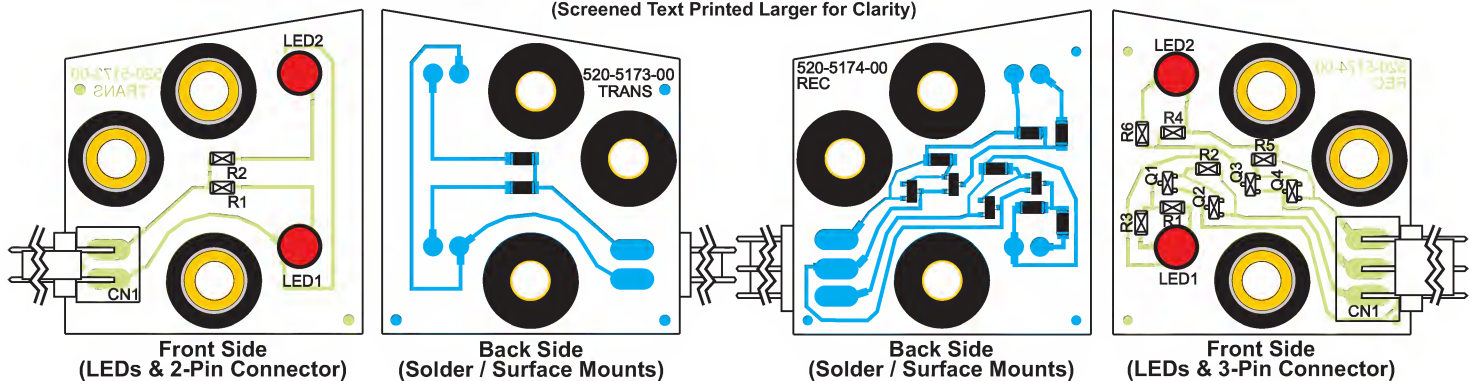
Trough Up-Kicker Dual OPTO Boards Component Layout & Parts

520-5173-00 (TRANS)

Boards Actual Size

520-5174-00 (REC)

(Screened Text Printed Larger for Clarity)



ITEM	QTY	PART NUMBER	REF-DESIGNATOR
A	1	515-0173-00	Dual-OPTO Trans. Bd. Assy.
—	1	520-5173-00	Dual-OPTO Trans. Board
01	1	045-5111-02	CN1
02	2	165-5052-00	LED1, LED2
03	2	121-5067-00	R1, R2
04	3	530-5308-02	n/a
05	3	545-5518-00	n/a
B	1	515-0174-00	Dual-OPTO Rec. Bd. Assy.
—	1	520-5174-00	Dual-OPTO Rec. Board
01	1	045-5111-03	CN1
02	2	165-5052-00	LED 1, LED 2
03	2	110-5006-00	Q1, Q3
04	2	110-0086-00	Q2, Q4
05	2	121-5082-00	R1, R4
06	2	121-5083-00	R2, R5
07	2	121-5011-00	R3, R6
08	3	530-5308-02	n/a
09	3	545-5518-00	n/a



Replacement Part:
LED TLRH180P
(T1-3/4 GaAlAs)
 SPI Part N°:
165-5052-00

DESCRIPTION

PCB Assy. (with all Items 1-5)
 PCB Assy. (with Items 1-3 only)
 2X, .156" Rt. Angle (26-60-5020) Conn.
LED TLRH180P (Ultra Bright Red)
 180 Ω 1/8W Chip Res. (CRCW)
 OPTO PCB Brass Tube Spacer
 OPTO PCB Rubber Grommet
 PCB Assy. (with all Items 1-9)
 PCB Assy. (with Items 1-7 only)
 3X, .156" Rt. Angle (26-60-5030) Conn.
LED TLRH180P (Ultra Bright Red)
 2N5460, Transistor (P-FET SOT-23)
2N3906, Transistor
 10M Ω 1/8W Chip Res. (CRCW)
 4.7K Ω 1/8W Chip Res. (CRCW)
 10K Ω 1/8W Chip Res. (CRCW)
 OPTO PCB Brass Tube Spacer
 OPTO PCB Rubber Grommet

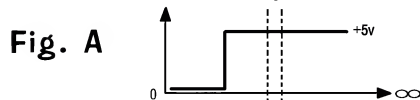
OPTO Troubleshooting

1. Volt Meter Test (indicates normal operating condition):

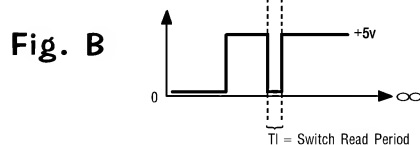
A. **OPEN OPTO** (Light Falling on LED) = **SWITCH OPEN**. Place meter leads across points **A** and **B** on the **LED1 Circuit** (Refer to Schematic Drawing on previous page, 520-5174-00 Receiver Side). It should read approximately 0.8 - 1.2v DC. The **LED2 Circuit** operates the same.

B. **CLOSED OPTO** (Light Blocked) = **SWITCH CLOSED**. Place meter leads across points **A** and **B** on the **LED1 Circuit** (Refer to Schematic Drawing on previous page, 520-5174-00 Receiver Side). It should read approximately 0.0 - 0.1v DC. The **LED2 Circuit** operates the same.

2. Oscilloscope Test (indicates normal operating condition):



A. **OPEN OPTO** (Light Falling on LED) = **SWITCH OPEN**. Place Scope lead at **Pin-1** of OPTO Rec. Board with Scope Grounded (see Schematic). The Scope should display a **STEADY +5v** as shown in **Fig. A**, Wave Form Diagram.



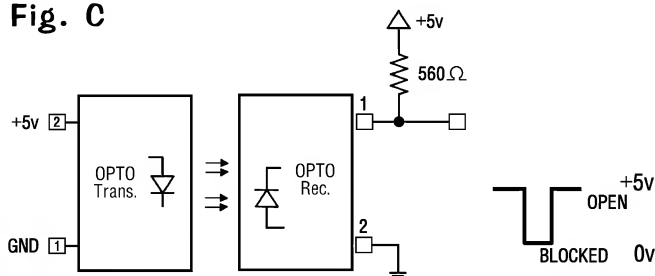
B. **CLOSED OPTO** (Light Blocked) = **SWITCH CLOSED**. Place Scope lead at **Pin-1** of OPTO Rec. Board with Scope Grounded (see Schematic). The Scope should display a **PULSE STREAM** indicating **Q2** has switched "On" as shown in **Fig. B**, Wave Form Diagram. This is your Switch Drive Pulse.

3. Bench Test (See Fig. C):

Please Note: To perform this test you must use a spare 560Ω Pull-Up Resistor, SPI N^o: 121-5047-00

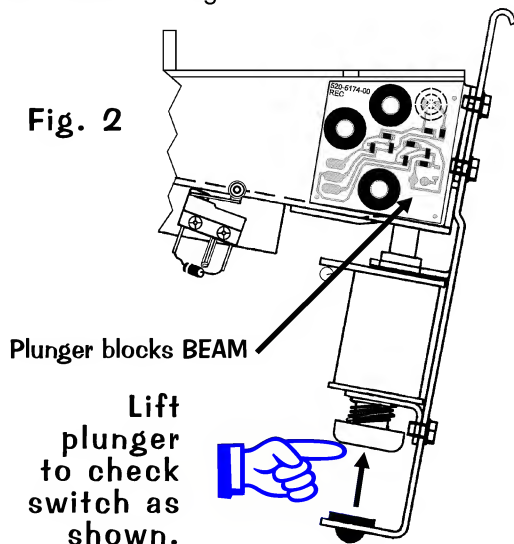
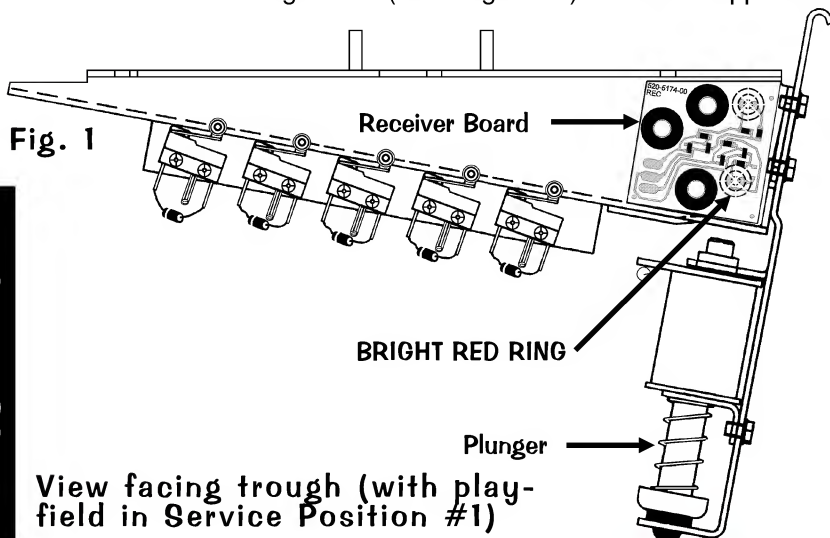
Disconnect the OPTO Transmitter / Receiver Board from the circuit. Connect one side of a 560Ω Pull-Up Resistor to **Pin-1** of the OPTO Receiver Bd. and the other side of the resistor to a 5v DC source. Connect **Pin-2** to GND. Connect a +5v DC source to **Pin-1** of the Transmitter & GND to **Pin-2**. Align with the Receiver OPTO approx. 3" distance. Using your Volt-Meter or an Oscilloscope, monitor **Pin-1** while **BLOCKING** and **UNBLOCKING** the **BEAM** from the Trans. The output will be approx. +5v DC when the **BEAM IS NOT BLOCKED** and approx. 0v when the **BEAM IS BLOCKED**.

Fig. C

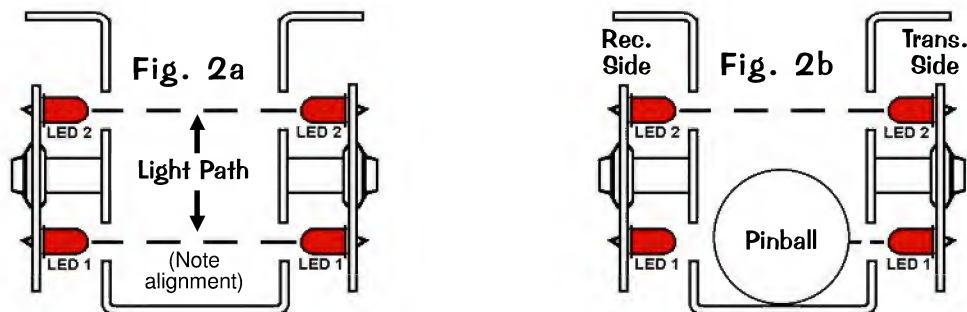


Trough Dual OPTO Boards Alignment / Test for LED1

When a working **OPTO** is installed and connected in a game, the transmitter should light (LED1 lower & LED2 upper) when the power is switched on. With the playfield in Service Position #1 (playfield lifted up in the half-way position resting on the Prop Rod or edge slide support brackets) and the game on, the LED lights should show up as a **BRIGHT RED RINGS** through the back of the Receiver Board around the **Receivers LED1 & LED2** (See **Fig. 1**). Testing only **LED1**: With the game in **Switch Test Mode**, lifting the Trough Plunger with a fingertip should block the **BEAM** and cause the Switch Position to trigger (See **Fig. 2**). View **Fig. 2a & 2b** (on the next page) for a sectional view of the Light Path (note alignment) and what happens as a ball breaks the light beam.

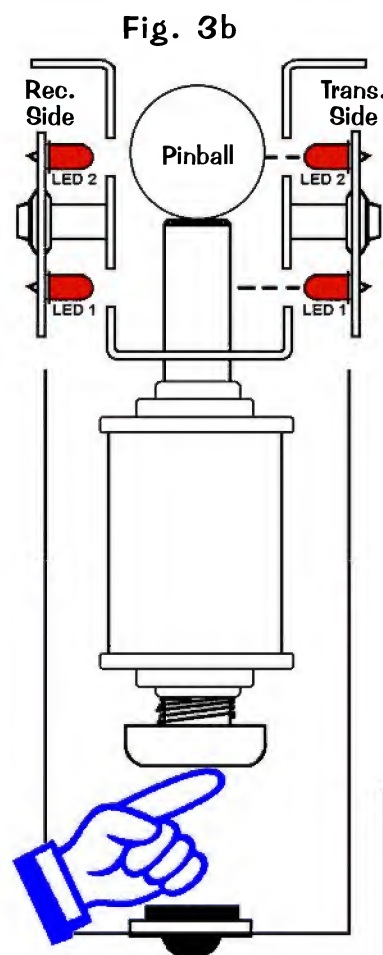
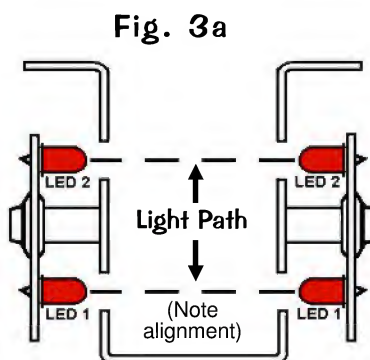
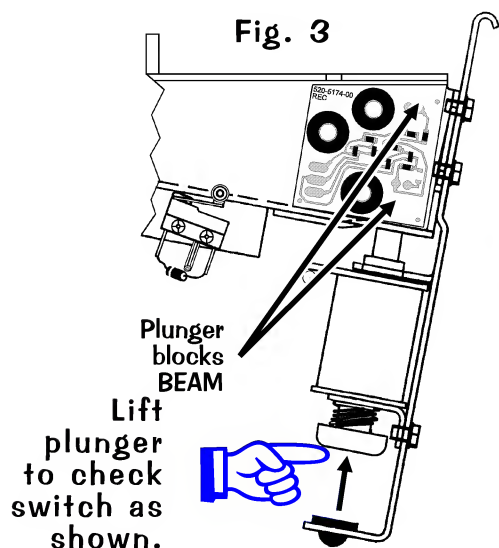


Sectional view from right (Fig. 2a & 2b)



Trough Dual OPTO Boards Alignment / Test for LED2

When a working **OPTO** is installed and connected in a game, the transmitter should light (LED1 lower & LED2 upper) when the power is switched on. With the playfield in Service Position #1 (playfield lifted up in the half-way position resting on the Prop Rod or edge slide support brackets) and the game on, the LED lights should show up as a **BRIGHT RED RINGS** through the back of the Receiver Board around the **Receivers LED1 & LED2** (See Fig. 1, previous page). Testing only **LED2**: *TO PERFORM THIS TEST, A PINBALL MUST BE IN THE BALL TROUGH.* With the game in **Switch Test Mode**, lifting the Trough Plunger with a finger tip should block the **BEAM** on LED2 and cause the Switch Position to trigger (See Fig. 3). View Fig. 3a & 3b for a sectional view of the Light Path (note alignment) and what happens as a "double-stacked" ball scenario breaks the light beam.



I M P O R T A N T

If replacement of **LED** is required, insure that is **mounted correctly before and after soldering** (See Fig. 4a / 4b).

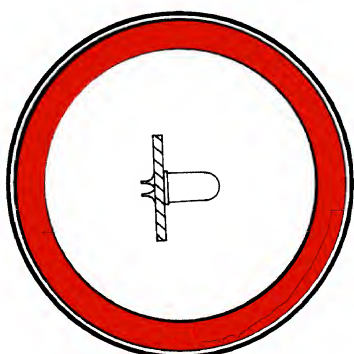


Fig. 4a
Correct Position

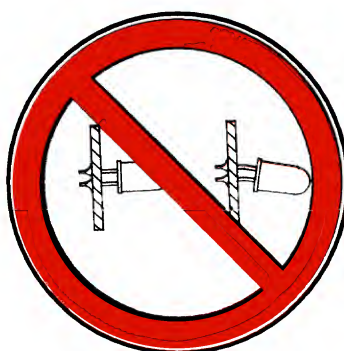
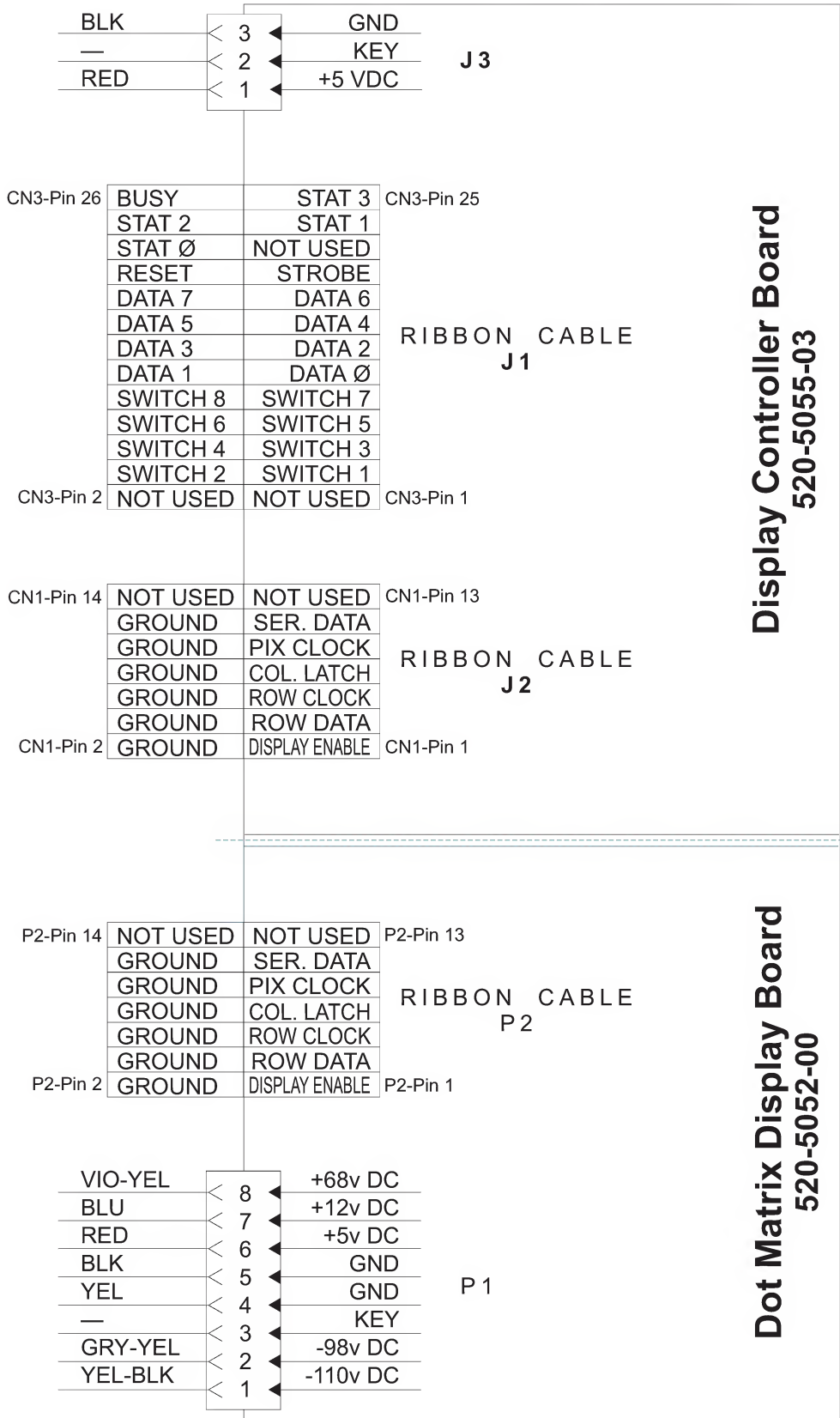
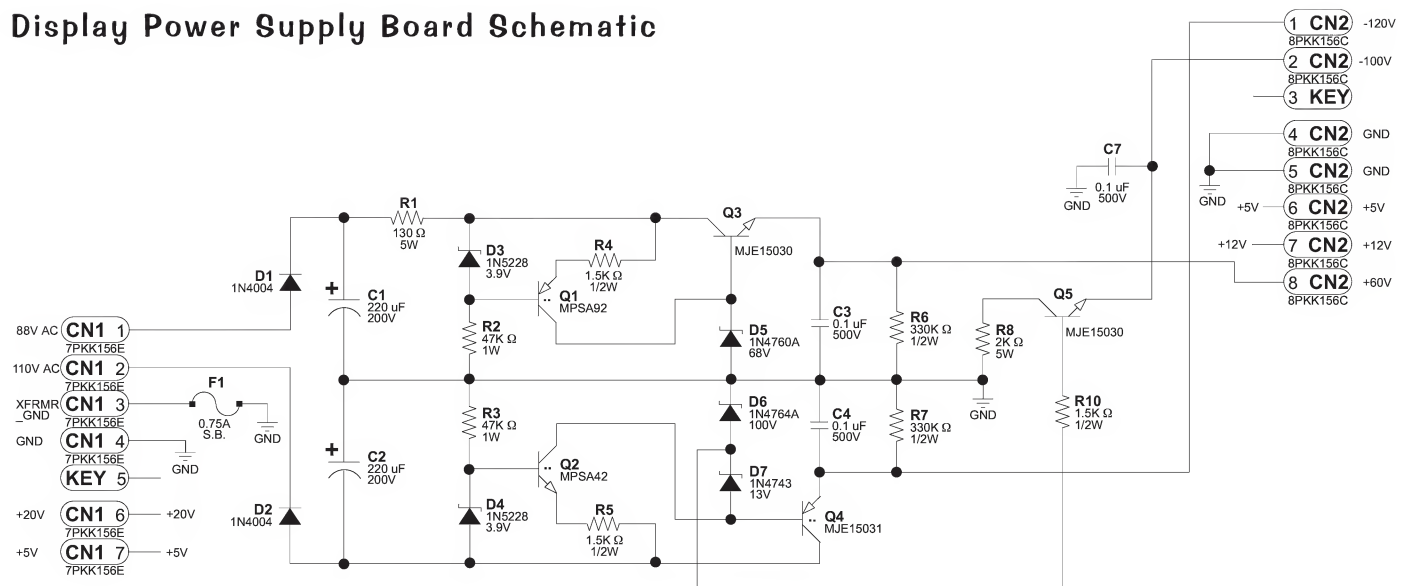


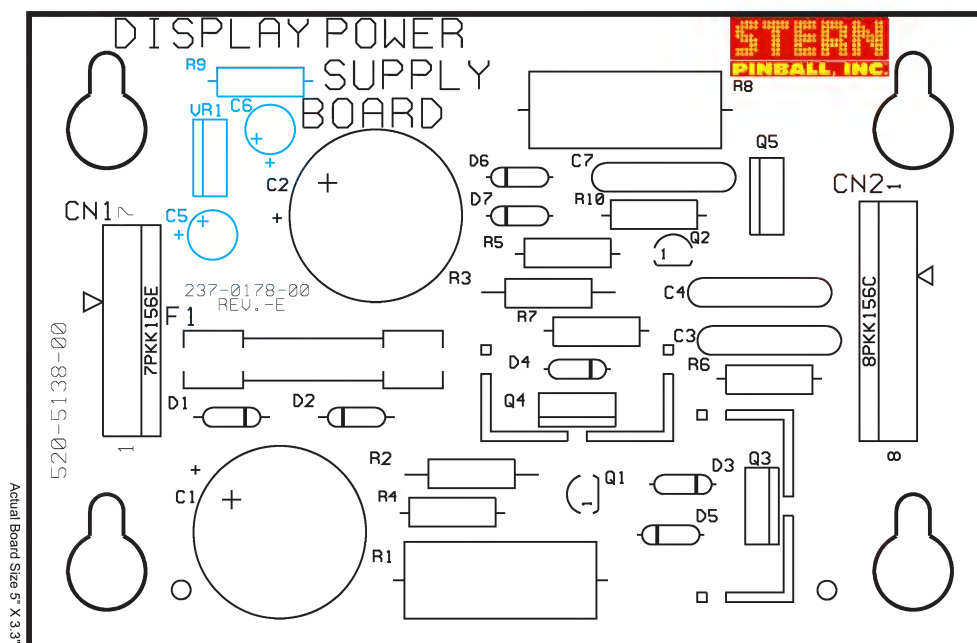
Fig. 4b
Incorrect Position



Display Power Supply Board Schematic

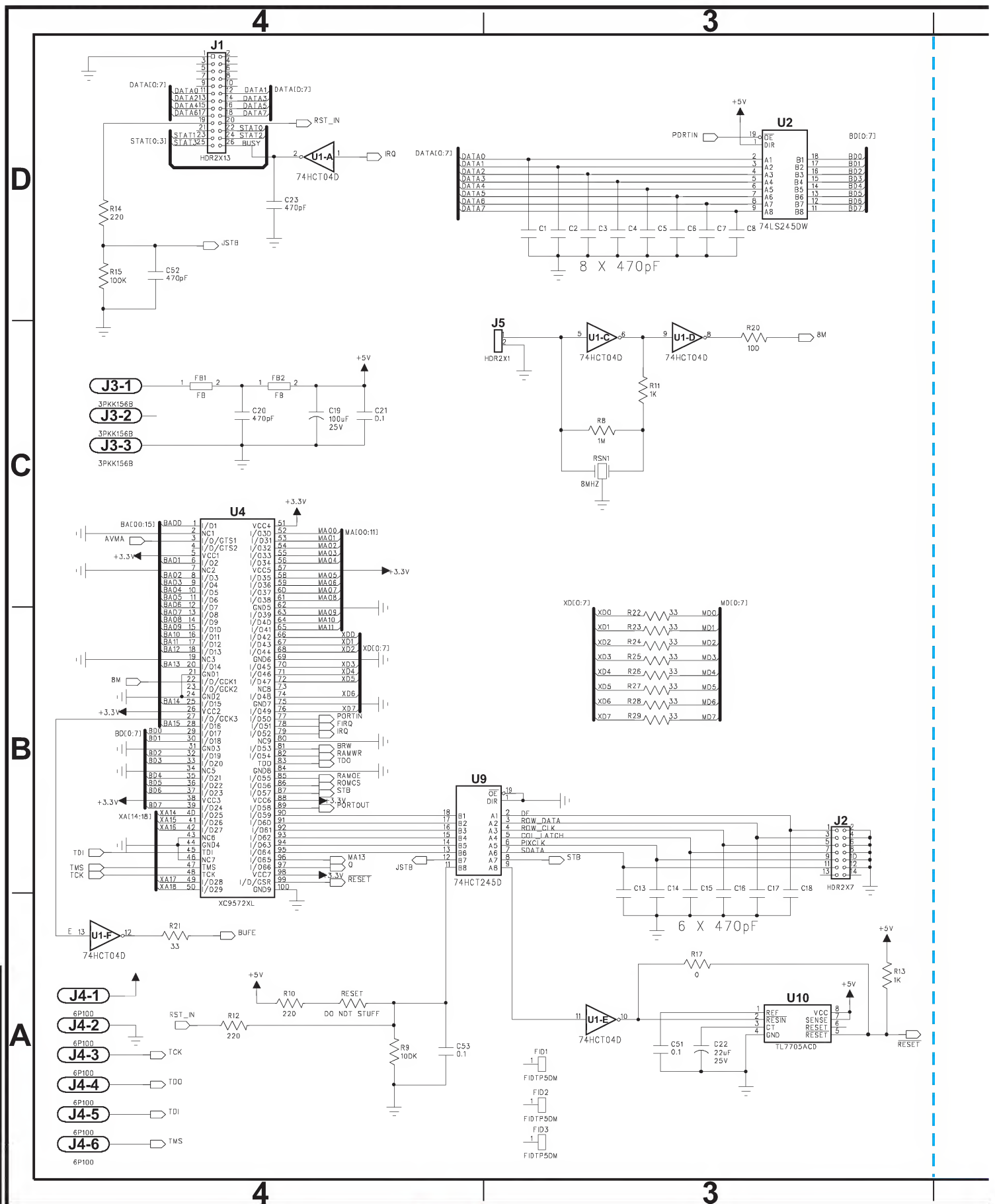


Display Power Supply Board Component Layout & Parts

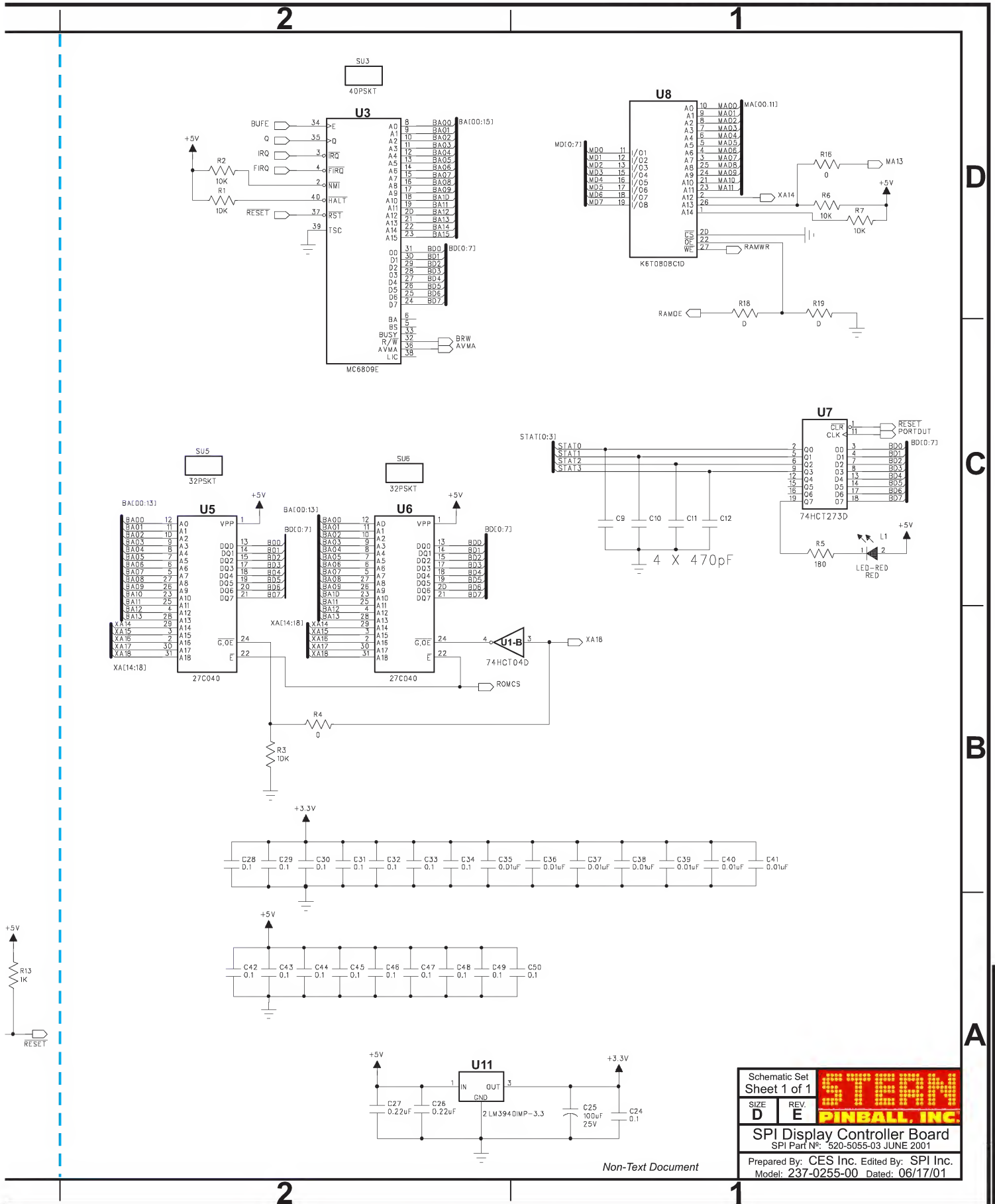


ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION (NS = Not Stuffed)
—	1	520-5138-00	Display Power Supply Board	Complete PCB Assembly
01	2	125-5044-00	C1, C2	220uF, 200v, Radial Lytic Cap.
02	3	125-5035-00	C3, C4, C7	0.1uF, 500v, Ceramic Disk Cap.
03	0	125-5003-00	(C5, C6: NS)	22uF, 35v, Rad Lytic Cap
04	1	045-5015-07	CN1	7PKK156E (PIN5=KEY)
05	1	045-5015-08	CN2	8PKK156 (PIN3=KEY)
06	2	112-5003-00	D1, D2	1N4004, Diode
07	2	112-0053-00	D3, D4	1N5228, 3.9v, Diode
08	1	112-0062-00	D5	1N4760A, 68v, Diode
09	1	112-0049-00A	D6	1N4764A, 100v, Diode
10	1	112-0061-00	D7	1N4743, 13v, Diode
11	1	200-5000-17	F1	3/4A (0.75A) S.B. Fuse
12	2	205-0004-00	F1	Fuse Clip
13	1	110-0100-00	Q1	MPSA92, Transistor
14	1	110-0082-00	Q2	MPSA42, Transistor
15	2	110-0101-00	Q3, Q5	MJE15030, Transistor
16	2	535-5000-11	Q3, Q4	Heatsinks - AAVID #563002
17	2	240-5008-00	Q3, Q4	#6-32 KEPS Nut
18	2	237-5501-00	Q3, Q4	#6-32 X 3/8" PPH Screw
19	1	110-0103-00	Q4	MJE15031, Transistor
20	1	121-5061-00	R1	130 Ω 5W Res.
21	2	121-5060-00	R2, R3	47K Ω 1W Res.
22	3	121-5038-00	R4, R5, R10	1.5K Ω 1/2W Res. (R9: NS)
23	2	121-5059-00	R6, R7	330K Ω 1/2W Res.
24	1	121-5062-00	R8	2K Ω 5W Res.
25	0	124-5003-00	(VR1: NS)	7812CT

Display Controller Board Schematic

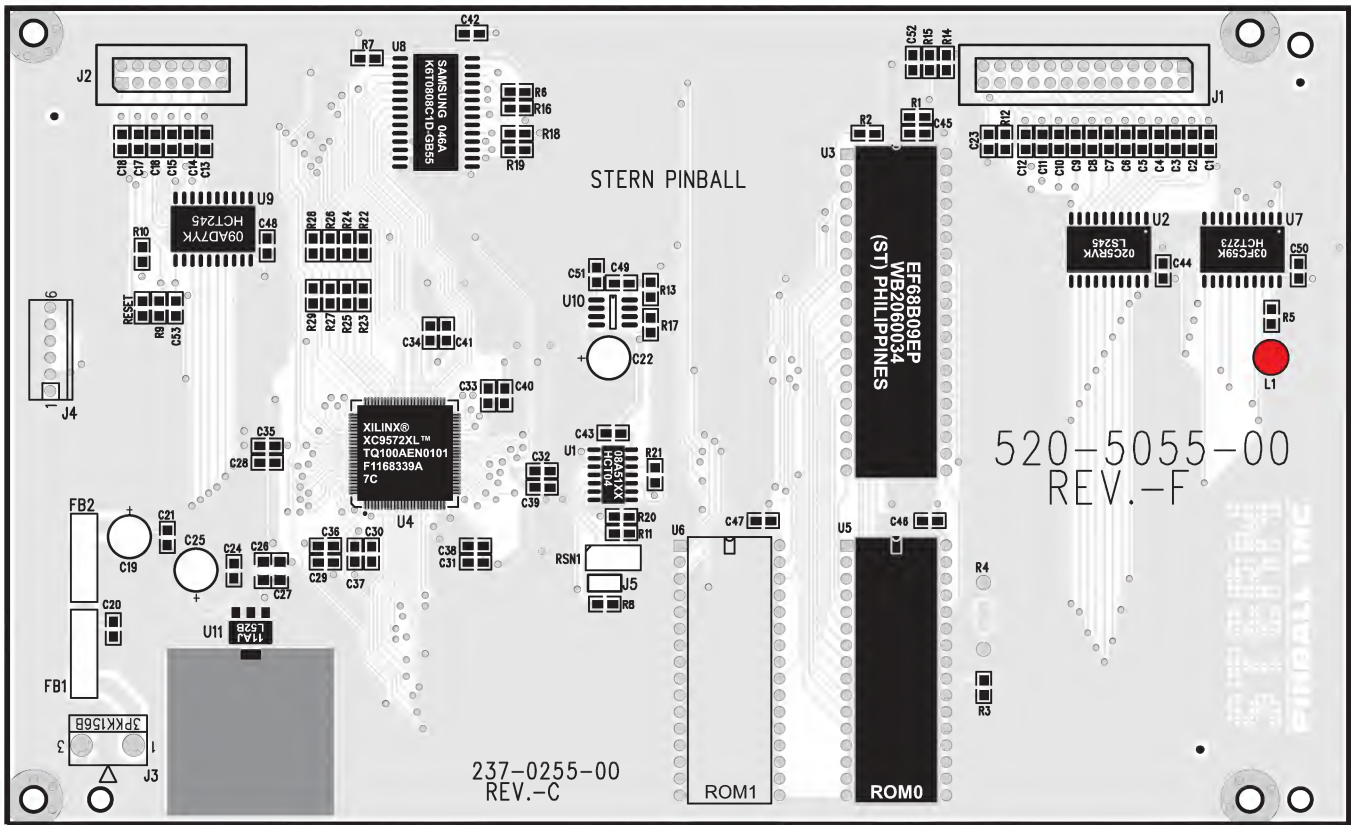


Display Controller Board Schematic



Sec. 5: PCBs

Display Controller Board Component Layout & Parts



ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION (NS = Not Stuffed)
—	1	520-5055-03	Display Controller Bd. (FCC FEB98) Rev. E June 2001	Complete PCB Assembly
1	2 (See Pg. DR. © Table)	077-5217-00	U5 (ROM0) (U6 (ROM1): NS)	4MB ROM 27C040 (M27C401-100)
2	2	045-5015-03	J3	32-Pin, IC Dip Socket
3	1	100-0189-01	U3	3-Pin, PKK156B Connector
4A	1		U3	MC6809E
4B	1		U3	40-Pin, Socket
5	1		J4	6-Pin (6P100)
6	1		U1	74HCT04D (74LS04)
7	1		U9	74HCT245D
8	1		U7	74HCT273D
9	1		U2	74LS245DW
10	1		RSN1	8MHZRSN (8Mhz) Crystal
11	7		C35-C39, C40, C41	0.01uF, 50v Cap.103-0805-X7R
12	20		C21, C24, C28-C32, C33, C34, C42, C43, C44, C45, C46 C47, C48, C49, C50, C53 (C51: NS)	0.1, 50v Cap. 104-0805
13	2		C26, C27	0.22uF, 50v Cap. 224-1206-Z5U
14	21		C1-C12, C13-C18, C20, C23, C52	470pF, 50v Cap. 471-0805
15	2	n/a	FB1, FB2	Ferrite Bead, FB0370
16	3		FID1-3	FIDTP50M
17	1	n/a	(J5: NS)	HDR2X1
18	1		J2	7-Pin, Dual Row .1" Hdr. Conn HDR2X7
19	1		J1	13-Pin, Dual row .1" Hdr. Conn HDR2X13
20	1	100-5045-00	U8	K6T0808C1D-GB55, Int. Samsung 046A
21	1	165-5099-00	L1	LED T1-3/4 DIFFUSER RED
22	1		U11	LM3940IMP-3.3
23	4		R16-R18 (R19: NS)	0Ω 1/10W Resistor 0805
24	1	n/a	RESET	DO NOT STUFF
25	1	n/a	(R4: NS)	RES0E1/4W5CF, 0
26	1		R20	100Ω 1/10W Resistor 0805
27	2		R9, R15	100KΩ 1/10W Resistor 0805
28	5		R1, R2, R3, R7 (R6: NS)	10KΩ 1/10W Resistor 0805
29	1		R5	180Ω 1/10W Resistor 0805
30	2		R11, R13	1KΩ 1/10W Resistor 0805
31	1		R8	1MΩ 1/10W Resistor 0805
32	3		R10, R12, R14	220Ω 1/10W Resistor 0805
33	9		R21, R22-R29	33Ω 1/10W Resistor 0805
34	2	125-5015-00	C19, C25	100uF, 25v TCap.
35	1	n/a	(C22: NS)	22uF, 25v TCap.
36	1	n/a	(U10: NS)	TL7705ACD
37	1	100-5044-00	U4	XC9572XL, Int. Xilinx®



I/O Power Driver Board Theory of Operation

5v Supply:

An AC voltage of approximately 9v comes into the board at [J17-(1-4)] this AC voltage is then *full-wave rectified* by bridge **BRDG 21** and filtered by Capacitor **C203**. The resulting voltage is 11v DC which is inserted into a linear voltage regulator for the output of 5v DC. This 5v regulated voltage can be adjusted by potentiometer **R116** the voltage should be set to 5.00v. Besides powering the I/O Board the regulated 5 volts supplies power to the CPU / Sound Board, Gas Plasma (Dot Matrix) Display and Plasma (Display) Controller Board. Power for these devices comes off the I/O Board on [J16-(4-8)].

+5v, +20v, +50v, +18v, & +12v LED Indicators:

These DC voltages are derived on the I/O Board by rectification and filtering. Each has a **LED** indicating that power is being supplied to each of these voltage sources. The **-12v** supply comes from the same transformer winding as the **+12v** thus it does not have a **LED** indicator.

**** Note** that the +50v & +20v power sources are turned off by the Interlock Switches when the Coin Door is OPEN.

LED	SUPPLY VOLTAGE
L2	+5
L200	+20v
L201	+50v
L202	+18v
L203	+12v

Reset Circuitry:

The I/O will reset in three (3) cases:

1. The CPU is in reset. The CPU's reset signal is fed into the I/O through connector **J1** and forces the I/O into reset.
2. The 5v supply has fallen below 4.75v.
3. The watchdog is not being fed by the scanning of the light matrix. More specifically **Pin-19** of **U6** must be toggling once every **50ms** to prevent the watchdog from resetting. The scanning of the light matrix is controlled by the CPU through **J1**.

LED L204 shows the reset state of the I/O Board. If this **LED** is not lit either the 5v DC is below 4.75v or the CPU/Sound Board is holding the I/O in reset. If the **LED** is flashing this means that the watchdog is not being feed by the CPU/Sound Board and the I/O is oscillating into and out of reset. If the **LED** is continuously on the board is out of reset and communication from the CPU to the lamp matrix is confirmed. Testpoint Blanking is the actual reset signal on the I/O Board. A low voltage indicates that it is in reset this will turn off all Solenoid (Coil) Drivers, Flash Lamps, Lamp Matrix Drivers, Auxiliary Outputs and Flipper Outputs. A high voltage indicates that it is out of reset and normal operation can take place.

Address Decoding:

All Address decoding is done by two **74LS138's** (**U204 & U205**) (3 of 8 decoder). Both of these must be in operation for the I/O Board to function properly.

Solenoid (Coil) Drivers & Flash Lamps:

J8 & J9 are high side drivers for driving solenoids and other heavy loads. Each connector has its own buffer driving 8 drivers. **J8 & J9** consist of **MOSFET Drivers 20N10L** which can easily & safely be tested by clipping one end of a clip-lead to test point **FET TPL1** and then the other to the corresponding gate resistor **R1-R16** (see *Note 1*). This will apply 3.4v to the gate of the **MOSFET Transistor** thus switching it on. **J7 & J6** each are a bank of 8 low side driver for driving lamps or other lower current solenoids (coils). They use a Bipolar Power Transistor **TIP122** which can also be tested by using **TEST POINT TIP TPL3** and the corresponding resistors **R17-R32*** (see *Note 1*).

Note 1 • Clip on the resistor side with the white stripe. •• R1 controls Q1, R2 controls Q2, et cetera...

Auxiliary In & Out:

J2-8 CMOS Outputs sometimes used for a printer interface.

J3-8 CMOS Inputs general purpose inputs.

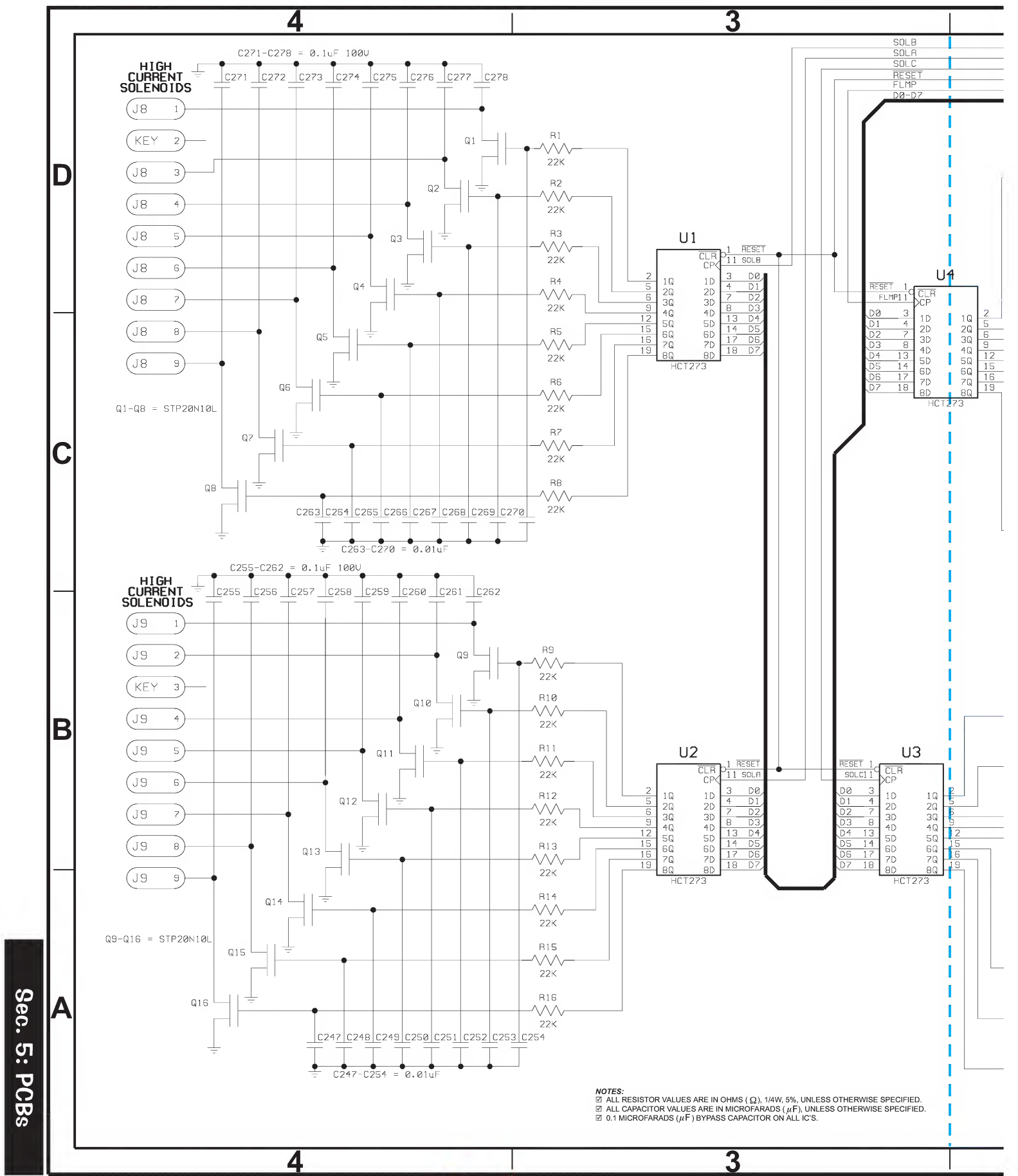
Lamp Matrix:

J12 has 10 low side drivers for the lamp strobes which consist of **19N06L MOSFETS**. Only one lamp strobe should be low at any time. Again the scanning of the lamp strobes keeps the I/O from resetting. **J13** has 8 high side drivers with each having a status indicator. All the status indicators are logically 'OR'ed together and fed back to the CPU/Sound Board. The status can identify open loads (for example open lamp filaments or intermittent connections) and short circuits. These drivers are also short-circuit protected.

General Illumination (G.I.) Lights:

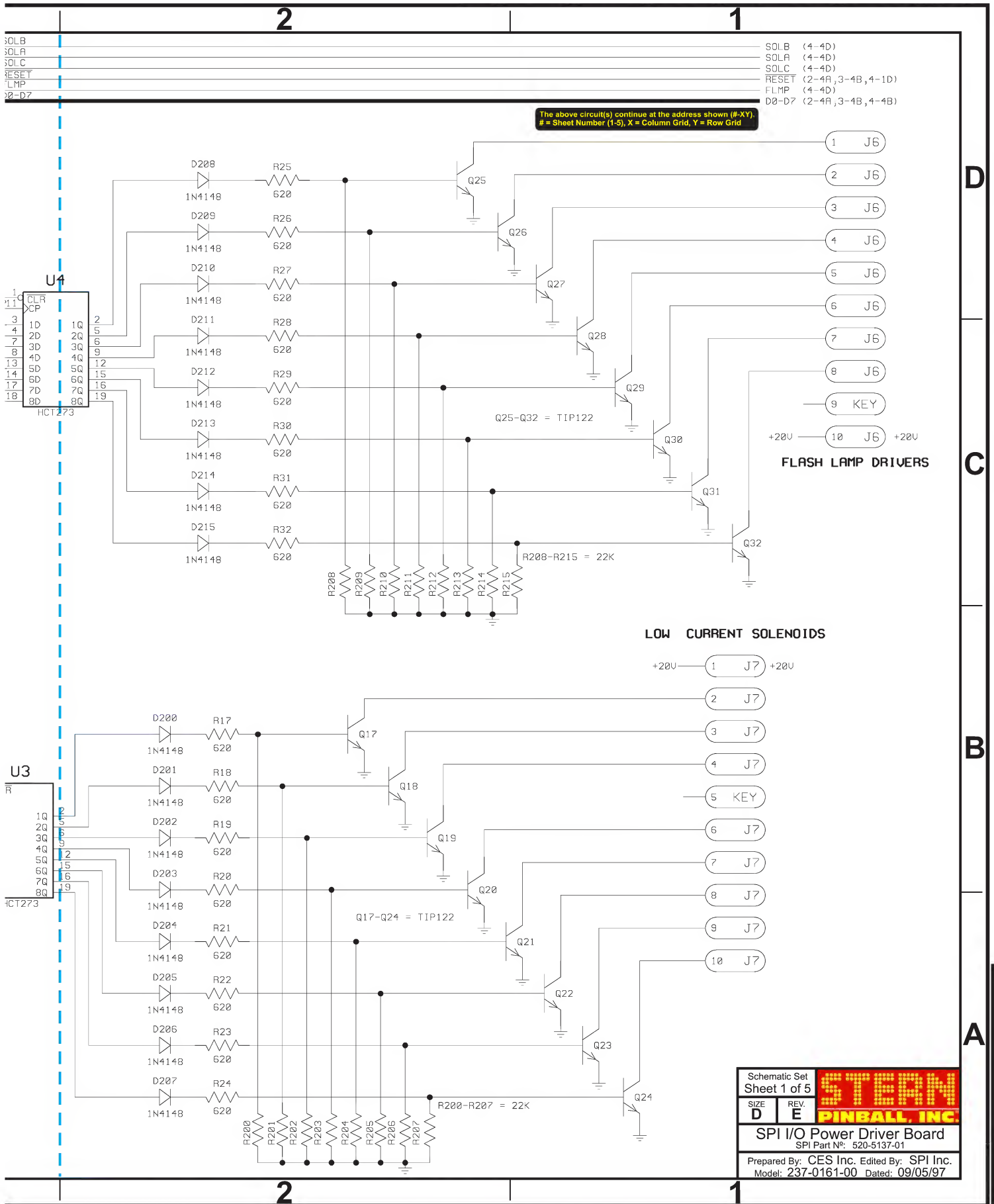
J15 has 6v AC switched on & off by a relay on the I/O Board. The relay is controlled by **Q200** which supplies power to the 24v coil winding to activate the relay. There are 4 taps on **J15** each fused at 5A for this 6v AC source.

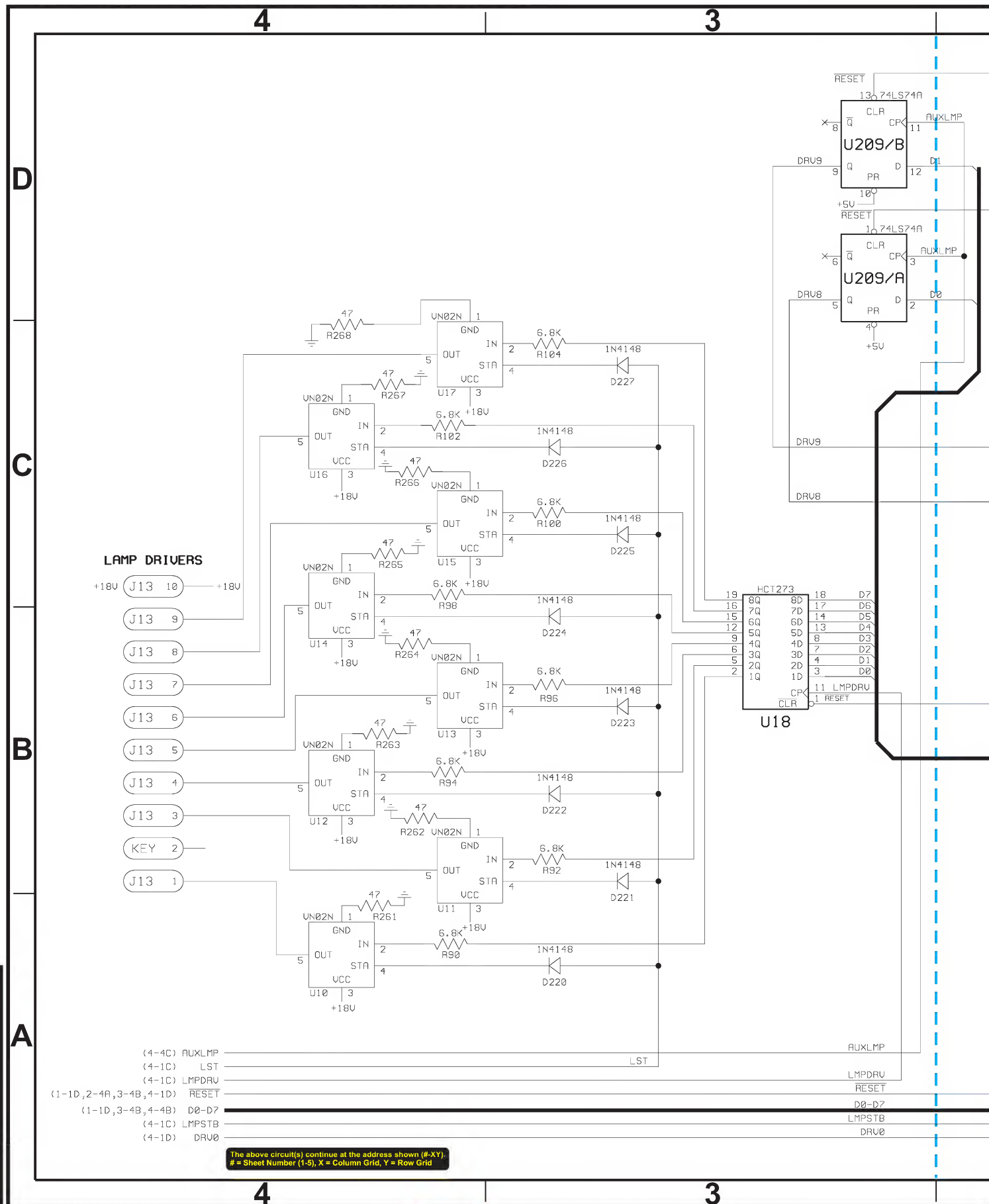
I/O Power Driver Board Schematic (Sheet 1 of 5)



Sec. 5: PCBs

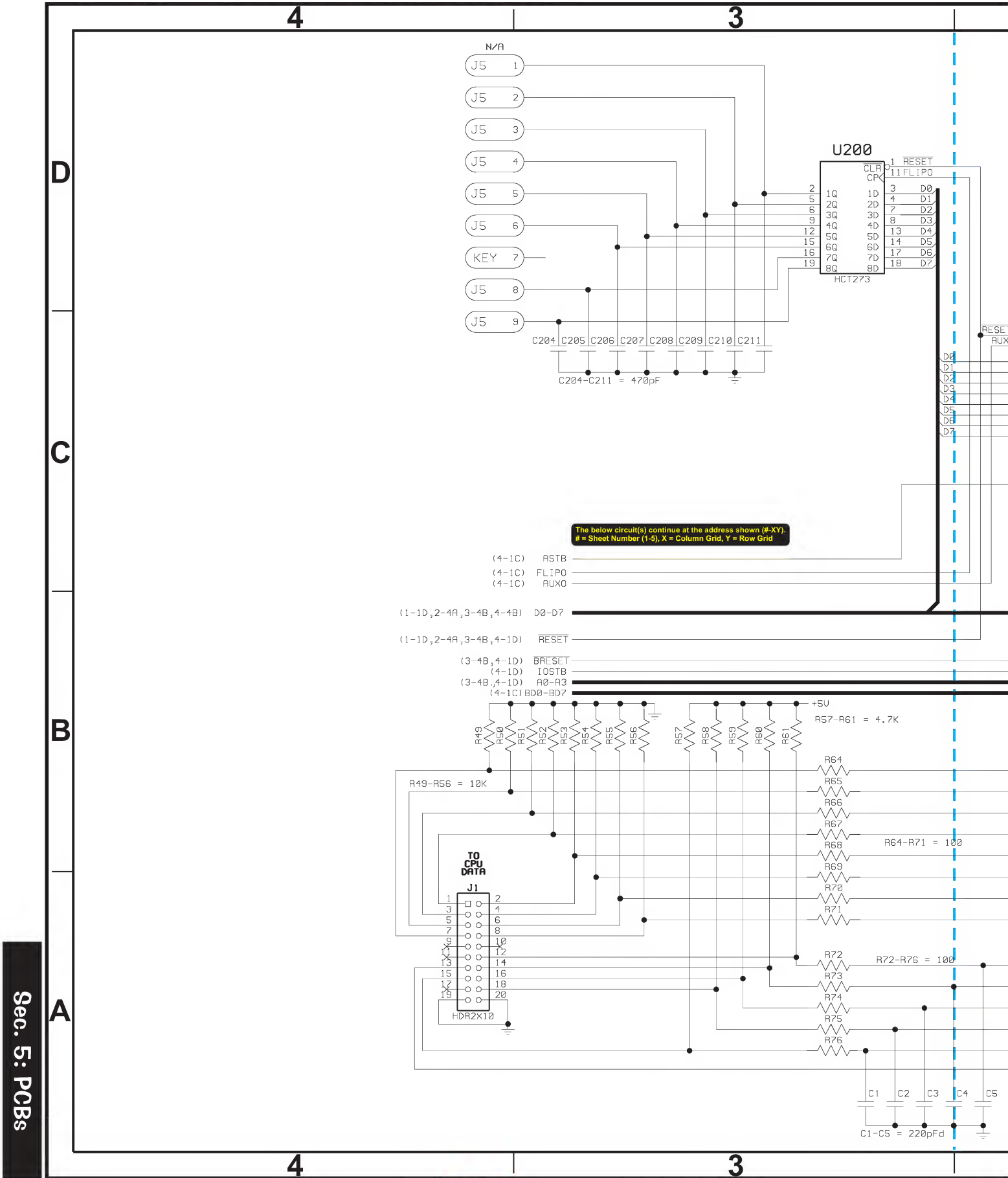








I/O Power Driver Board Schematic (Sheet 3 of 5)



2

1

NOTES:

- ☑ ALL RESISTOR VALUES ARE IN OHMS (Ω), 1/4W, 5%, UNLESS OTHERWISE SPECIFIED.
- ☑ ALL CAPACITOR VALUES ARE IN MICROFARADS (μF), UNLESS OTHERWISE SPECIFIED.
- ☑ 0.1 MICROFARADS (μF) BYPASS CAPACITOR ON ALL IC'S.

DATE

DESCRIPTION OF CHANGES / REVISIONS

REQ.

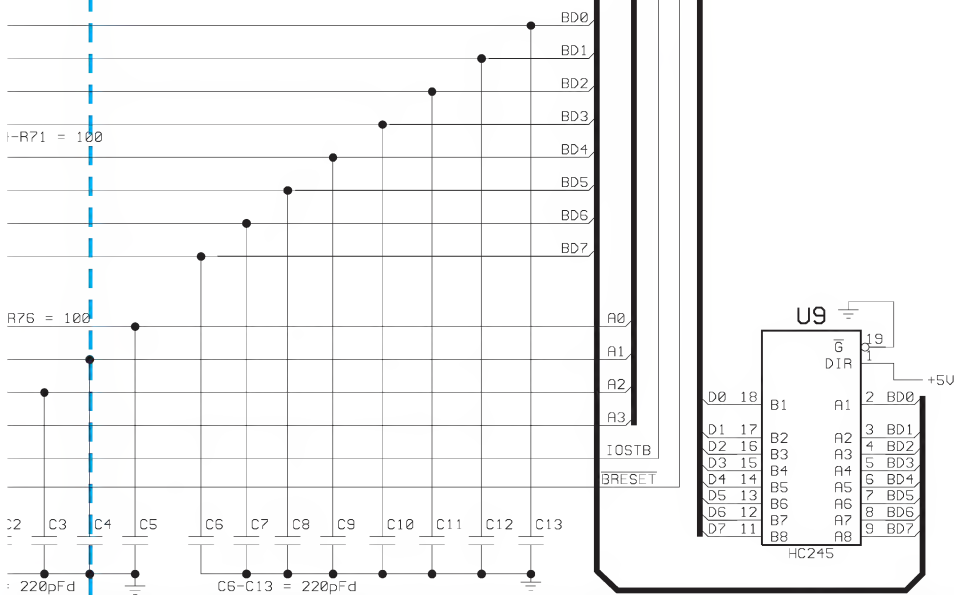
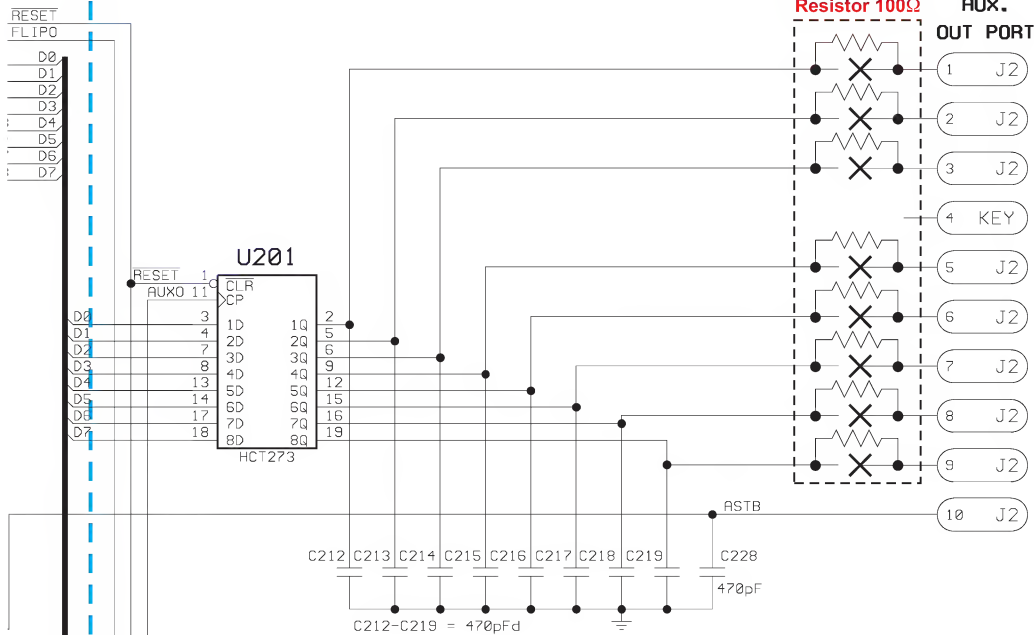
BY.

JAN 2001

Cut trace on solder side at Aux. Out Port J2-PIN1 thru J2-PIN9; Soldered **Resistor 100Ω** 1/4W 5% (SPI N#: 121-5007-00). This Modification (highlighted below at J2 with a dotted-line box) was accomplished on boards produced after Jan. 1, 2001. This board is backwards compatible for the White Star™ Board System.

TS

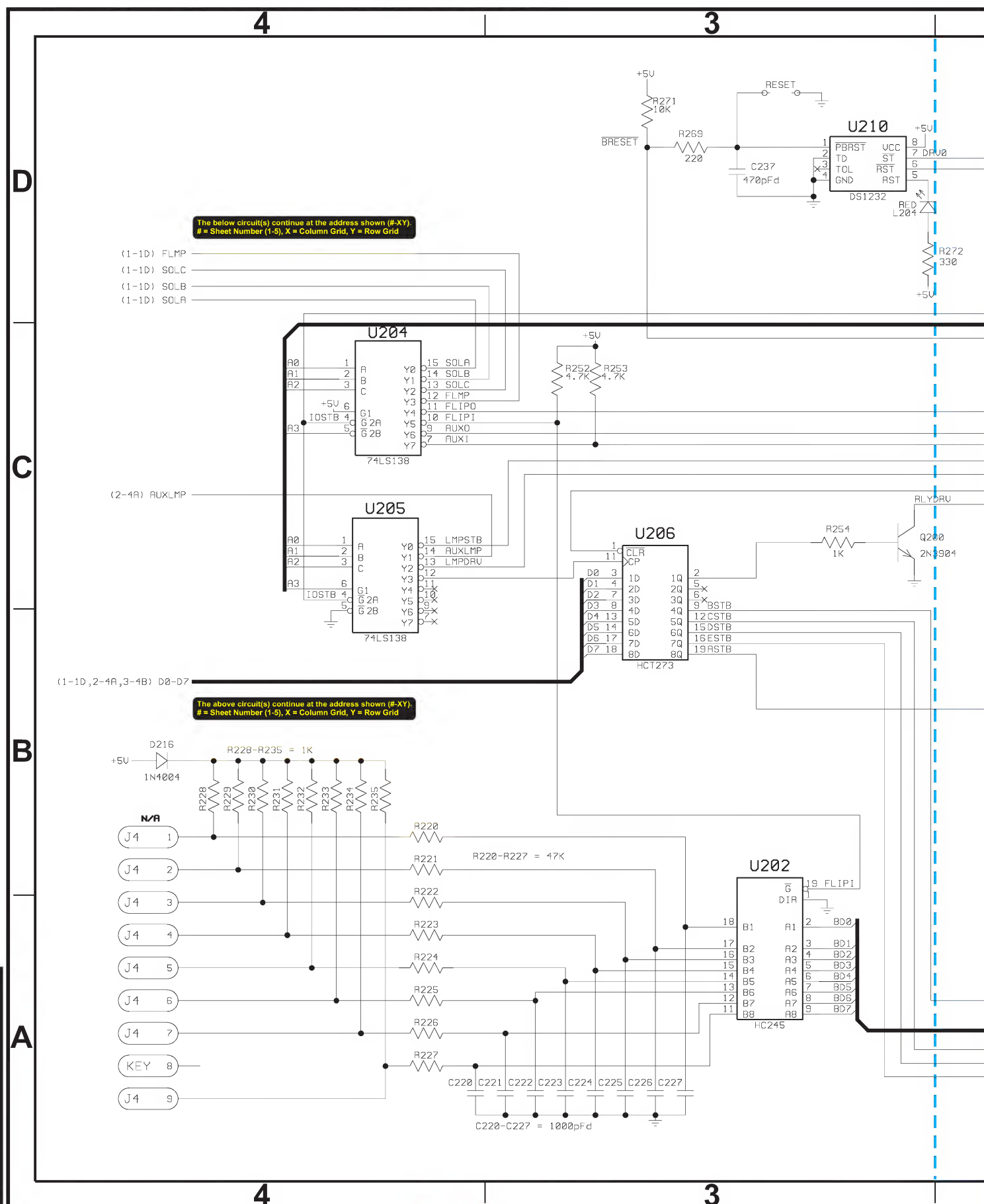
JET



2

1

Schematic Set Sheet 3 of 5		STERN PINBALL, INC.
SIZE D	REV. E	
SPI I/O Power Driver Board SPI Part N#: 520-5137-01		
Prepared By: CES Inc. Edited By: SPI Inc. Model: 237-0161-00 Dated: 09/05/97		

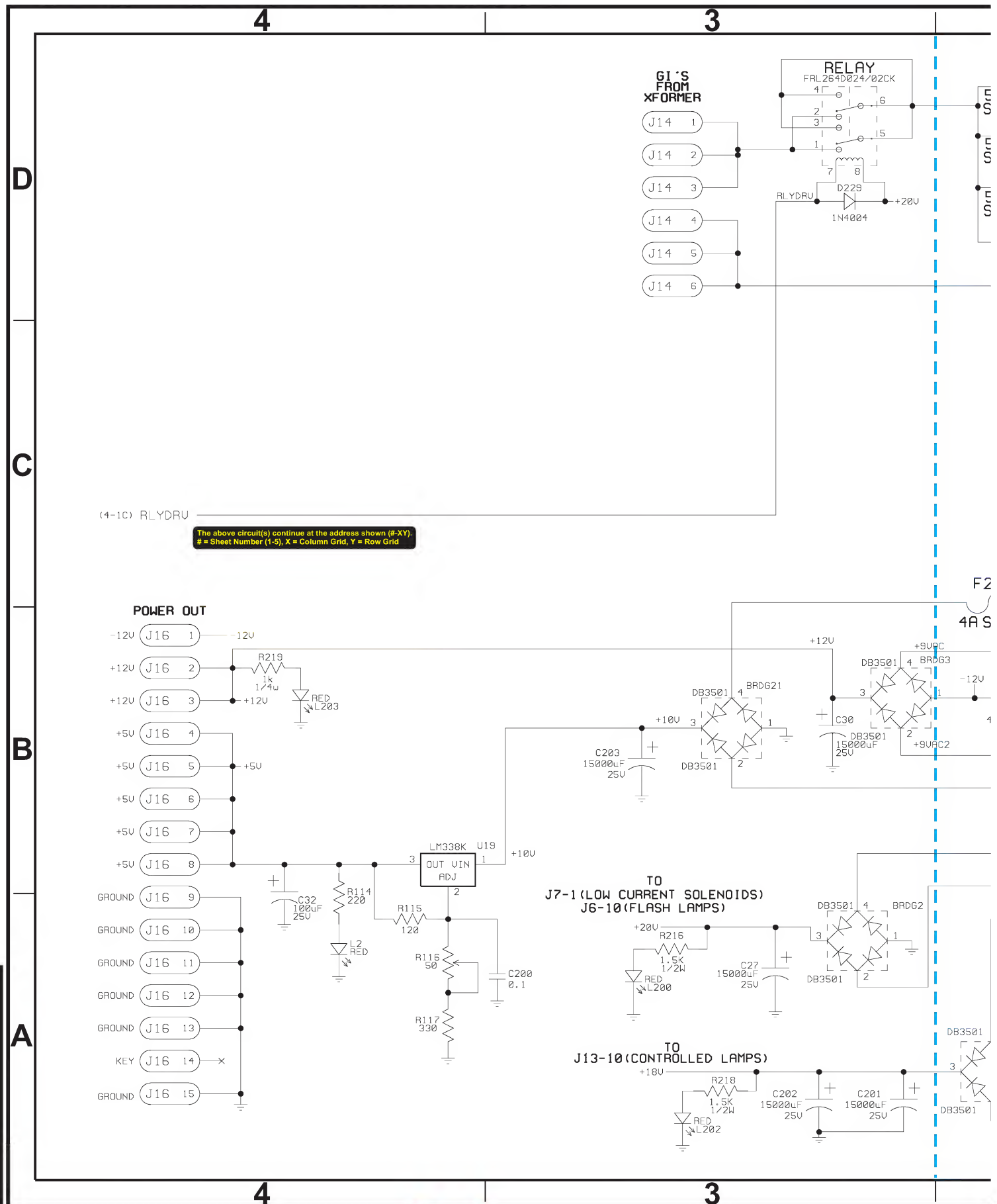


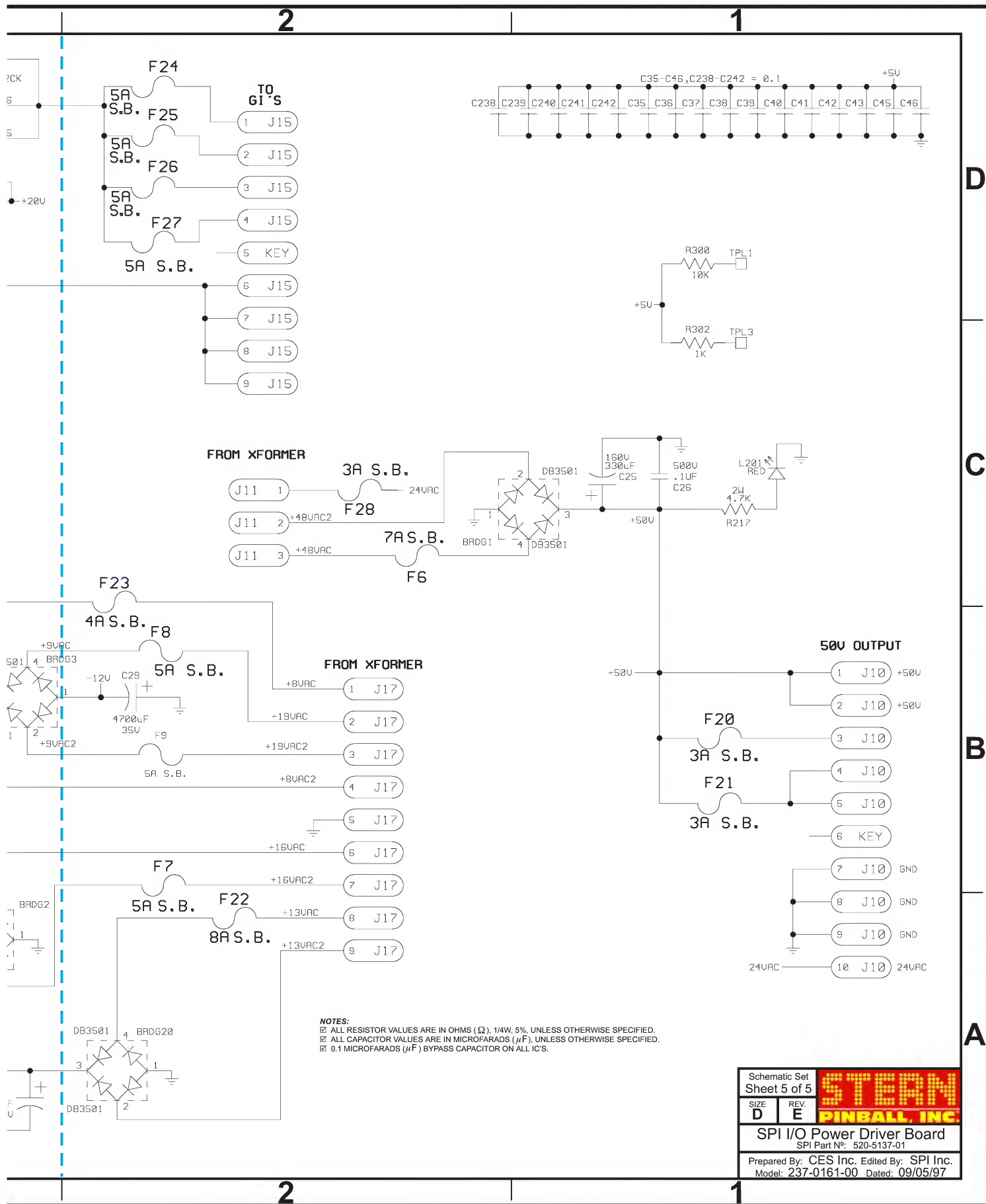
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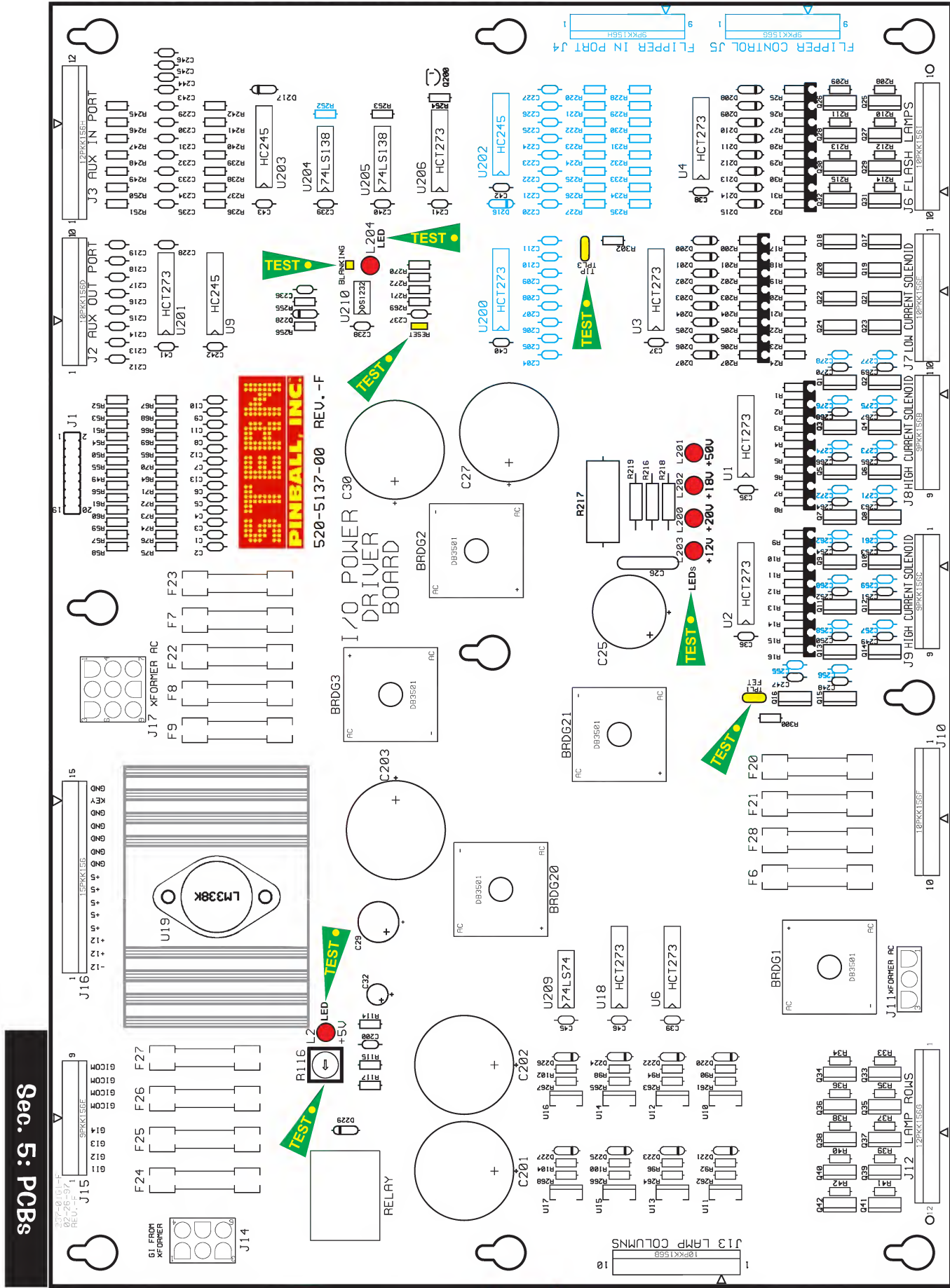
Prepared By: CES Inc. Edited By: SPI Inc.
Model: 237-0161-00 Dated: 09/05/97

Section 5, Chapter 4
Page 121





I/O Power Driver Board Component Layout



Test Points:



← TIP TPL3
← BLANKING
← L204 LED

← RESET

LEDs :
← L201+50v
← L202+18v
← L200+20v
← L203+12v

← FET TPL1

LED :
← L2+5V
← R116 POT

Actual Board Size 15.698" X 11"

Sec. 5: PCBs



I/O Power Driver Board Parts

ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION (NS = Not Stuffed)
—	1	520-5137-01	I/O Power Driver Board	Complete PCB Assembly
01	5	112-5000-00	BRDG1, BRDG2, BRDG3, BRDG20, BRDG21	DB3501
02	13	125-5030-00	C1, C2, C3>C6, C7, C8, C9>C10, C11, C12	220pF, (221), Cap.
03	1	125-5033-00	C25	100uF, 150v, Radial Lytic Cap.
04	1	125-5035-00	C26	.1uF, 500v, Ceramic Disk Cap.
05	5	125-5036-00	C27, C30, C201, C202, C203	15000uF, 25v, Radial Lytic Cap.
06	1	125-5034-00	C29	4700uF, 35v, Radial Lytic Cap.
07	1	125-5032-00	C32	100uF, 25v, Radial Lytic Cap.
08	17	125-5031-00	C35, C36, C37, C38, C39, C40, C41, C42, C43, C45, C46, C200, C238, C239, C240, C241, C242	0.1uF, (104), Cap.
09	22	125-5028-00	C212>C219, C228>C237, C243>C246 (C204-C211: NS)	470pF, (471), Axial Cap.
10	0	n/a	(C220>C227: NS)	
11	16	125-5029-00	C247>C254, C263>C270	0.01uF, (103), 100v Cap.
12	0	125-5027-00	(C255>C262, C271>C278: NS)	0.1uF, (104), 100v, Cap.
13	25	112-0054-00	D200>D207, D208>D215, D220, D221, D222, D223, D224, D225, D226, D227	1N4148, Diode
14	2	112-5003-00	D217, D229 (D216: NS)	1N4004, Diode
15	26	205-0004-00	F6, F7, F8, F9, F20, F21, F22, F23, F24> F27, F28	Fuse Clips
16	1	200-5000-03	F6	7A 250v S.B. Fuse
17	7	200-5000-01	F7, F8, F9, F24>F27	5A 250v S.B. Fuse
18	3	200-5000-08	F21, F20, F28	3A 250v S.B. Fuse
19	1	200-5000-05	F22	8A 250v S.B. Fuse
20	1	200-5000-06	F23	4A 250v S.B. Fuse
21	1	045-5015-01	J1	20-Pin, 0.1 Dual Row Header
22	1	045-5014-01	J2 (Key Pin-4), J6 (Key Pin-9), J7 (Key Pin-5)	10PKK156
			J10 (Key Pin-6), J13 (Key Pin-2)	
23	1	045-5015-00	J3 (Key Pin-8)	12PKK156
	0	n/a	(J4, J5: NS)	
24	1	045-5013-00	J8 (Key Pin-2), J9 (Key Pin-3), J15 (Key Pin-5)	9PKK156
25	1	045-0014-03	J11	10-84-4030 (3-Pin MOLEX)
26	1	045-5015-00	J12 (Key Pin-7)	12PKK156
27	1	045-0014-06	J14	10-84-4060 (6-Pin MOLEX)
28	1	045-5016-00	J16 (Key Pin-14)	15PKK156
29	1	045-0014-09	J17	10-84-4090 (9-Pin MOLEX)
30	6	165-5099-00	L2, L200, L201, L202, L203, L204	LED T1-3/4 DIFFUSER LED
31	16	110-0106-00	Q1>Q16	22NE10L STP, Transistor
32	16	110-0067-00	Q17>Q24, Q25>Q32	TIP122
33	10	110-0088-00	Q33>Q42	19N06L STP, Transistor
34	1	110-0069-00	Q200	2N3904, Transistor.
35	32	121-5042-00	R1>R8, R9>R16, R200>R207, R208>R215	22K Ω 1/4W Res.
36	16	121-5003-00	R17>R24, R25>R32	620 Ω 1/4W Res.
37	17	121-5045-00	R33>R42, R236>R242	39K Ω 1/4W Res.
38	8	121-5021-00	R49, R57>R61, R253, R256, R270 (R252: NS)	4.7K Ω 1/4W Res.
39	11	121-5011-00	R50>R56, R255, R271, R300	10K Ω 1/4W Res.
40	13	121-5007-00	R64>R76	100 Ω 1/4W Res.
			Resistors on Solder Side @ J2-Pins: 1-3 & 5-9	
41	8	121-5029-00	R90, R92, R94, R96, R98, R100, R102, R104	6.8K Ω 1/4W Res.
42	2	121-5033-00	R114, R269	220 Ω 1/4W Res.
43	1	121-5030-00	R115	120 Ω 1/4W Res.
44	1	121-5039-00	R116	50 Ω Pot
45	2	121-5036-00	R117, R272	330 Ω 1/4W Res.
46	2	121-5038-00	R216, R218	1.5K Ω 1/2W Res.
47	1	121-5050-00	R217	4.7K Ω 2W Res. (SANDBAR)
48	1	121-5009-00	R219	1K Ω 1/4W Res.
49	0	n/a	(R220>R227: NS)	
50	9	121-5009-00	R245>R251, R254, R302 (R228>R235: NS)	1K Ω 1/4W Res.
51	8	121-5032-00	R261, R262, R263, R264, R265, R266, R267, R268	47 Ω 1/4W Res.
52	1	190-5002-00	RELAY	FRL264D024/02CK Relay
53	2	n/a	TPL1, TPL3	Test Point Wire (24ga.) Loops
54	8	100-5012-00	U1, U2, U3, U4, U6, U18, U201, U206 (U200: NS)	74HCT273
55	1	110-0058-00	U9	74LS245
56	1	100-5023-00	U210	DS1232
57	8	110-0089-00	U10, U11, U12, U13, U14, U15, U16, U17	VN02N
58	1	100-0356-00	U19	LM338K
59	1	n/a	U19	Heatsink (5v Reg.)
60	1	100-0338-00	U203 (U202: NS)	74HC245
61	2	100-0148-00	U204, U205	74LS138
62	1	100-0037-00	U209	74LS74
63	1	n/a	BLANKING, RESET	Test Points



CPU/Sound Board Theory of Operation

CPU Section:

The CPU is a **68B09E (U209)** with up to 8 MBytes of CPU Code Space (**U210**). The CPU code is bank selected by the use of **U211** and each bank consists of 16 KBytes. 8 KBytes of **RAM (U212)** is available to the CPU. The RAM is battery backed and has a write protected area. Battery back up is accomplished by **3-AA Cells (BAT1)** which have a **TEST POINT VBATT** to check the battery voltage status. The write protected area consists of 512 Bytes used for storing game settings. This section of **RAM** can only be written to when the coin door is open. The Coin Door switch comes into the CPU on **CN6-12** and is fed into the address decoding **PAL U213**. When this memory protect signal is low writes to the protected **RAM** area are prohibited. Address decoding for the system is accomplished by one **PAL U213** and one 1-of-8 decoder **U214**.

A watchdog is used to monitor the CPU and the 5v supply. If the 5v supply is below 4.75 the watchdog will hold the CPU/Sound Board & I/O Board in *reset*. The watchdog must be fed at a rate of **250ms** or faster. The signal used to feed the watchdog comes from the EPROM Bank select signal used to load **U211**. The CPU has a timer interrupt used as a heartbeat for the system this signal comes from counter **U2**. The clock for this counter is the **CPU Q CLOCK**. Clearing the timer interrupt is done by reading the **DIP Switch**. The timer interrupt can be observed at **TEST POINT FIRQ**. In normal operation "**FIRQ**" should be toggling at a rate of 976Hz.

The I/O Interface **CN1** is buffered by two (2) **HC245 Chips (U207 & U208)**. The CPU's reset line is buffered by **Q10** and fed over to the I/O through **CN1**. An I/O Strobe Signal is fed through **CN1-15** and is used to notify the I/O that a valid address is being sent.

Switches:

The Switch Matrix consists of eight (8) **2N3904 Transistors (Q1-Q8)** which pull one of 8 strobes 'low' to *activate* a Single Column of switches. The *Switch Return Signals* are fed into **CN7 [SWITCH ROWS]** and are highly filtered and compared to a 2.5v reference voltage. The *Switch Return Voltage* must be below 2.5v to make a *Valid Switch Closure*. If *false switches* are appearing, check that none of the **2N3904 Transistors** are permanently pulling the *strobe line low*. Only one strobe from **CN5 [SWITCH COLUMNS]** should be *low at any time*. **CN6 [DEDICATED SWITCH IN]** is a *Dedicated Bank of Input Switches*. Switches connected to **CN6** are connected to ground instead of a strobe and may be read at any time.

Plasma Interface:

The data path for communication to and from the Plasma Controller Board is 8 bits wide. There are separate *Input and Output Busses*. The *Input Bus* from the Plasma Controller to the CPU/Sound Board comes in on **CN8 [PLASMA CONTROL]-Pins 3-10** and is fed into **U200** for input to the CPU's *Data Bus*. Data going out to the controller comes from the CPU's *Data Bus* through **U201** and onto **CN8-Pins 11-18**. Status back from the Plasma Controller comes in on **CN8-Pins 22-26** and is fed into **U202** for input to the CPU's *Data Bus*. Two control signals that go out to the Plasma Controller are **PRES [PLASMA RESET]** and **CN8-Pin 19 [PSTB - Plasma Strobe]**. The Plasma Reset is software controllable through **U216/B** and also has a test point "Plasma Reset". The *Plasma Strobe Signal* to the controller is generated from **U216/A** and is *used to latch data* into the Plasma Controller.

Sound Section:

The audio section consists of a **BSMT SOUND CHIP U9** Sound (Voice) EPROMs (**U17 U21 U36 U37**) **68B09E U6** and Sound Code **EPROM U7**. The **BSMT** latches sound EPROM addresses in **U13 & U12** for output to the Sound EPROMs. Sound Data from the EPROMs is read through **U19** to the **BSMT**. The EPROMs are bank selected by **U22**. When the **BSMT** has sound data to be played out to the speakers it loads 16 bits into a 16 bit shift register made up of **U24 & U23**. The data stream from the shift register is serially shifted into a stereo 16 bit *Digital to Analog Converter (DAC, U26)*. When the system is operating properly the ws (word select) input of the **DAC** will be toggling. The ws input is used to latch the right and left channel sound data into the **DAC**. If the ws line is not oscillating no analog signal will come out of the **DAC**. The **DAC** outputs are a controlled current source. These outputs are converted to a voltage by an operational amplifier **U30** to form the analog signal. **TEST POINTS AOR** and **AOL** are the outputs of the operational amplifier. These outputs are then fed directly into the power amplifiers (**TDA2030A**) or optionally into an analog volume control chip **U35** for a potentiometer volume control. The analog section has its own +5v & -5v derived from **VR1 & VR2**. These separate supply voltages are for the **DAC U26** Operational Amplifier **U30** and analog volume control **U35**.

Sound calls are made from the **CPU's 68B09E U209** to the sound section by latching data into **U5**. The sound section's **CPU 68B09E (U6)** reads in this data and handles the interfacing to the **BSMT**.

Other Test Points:

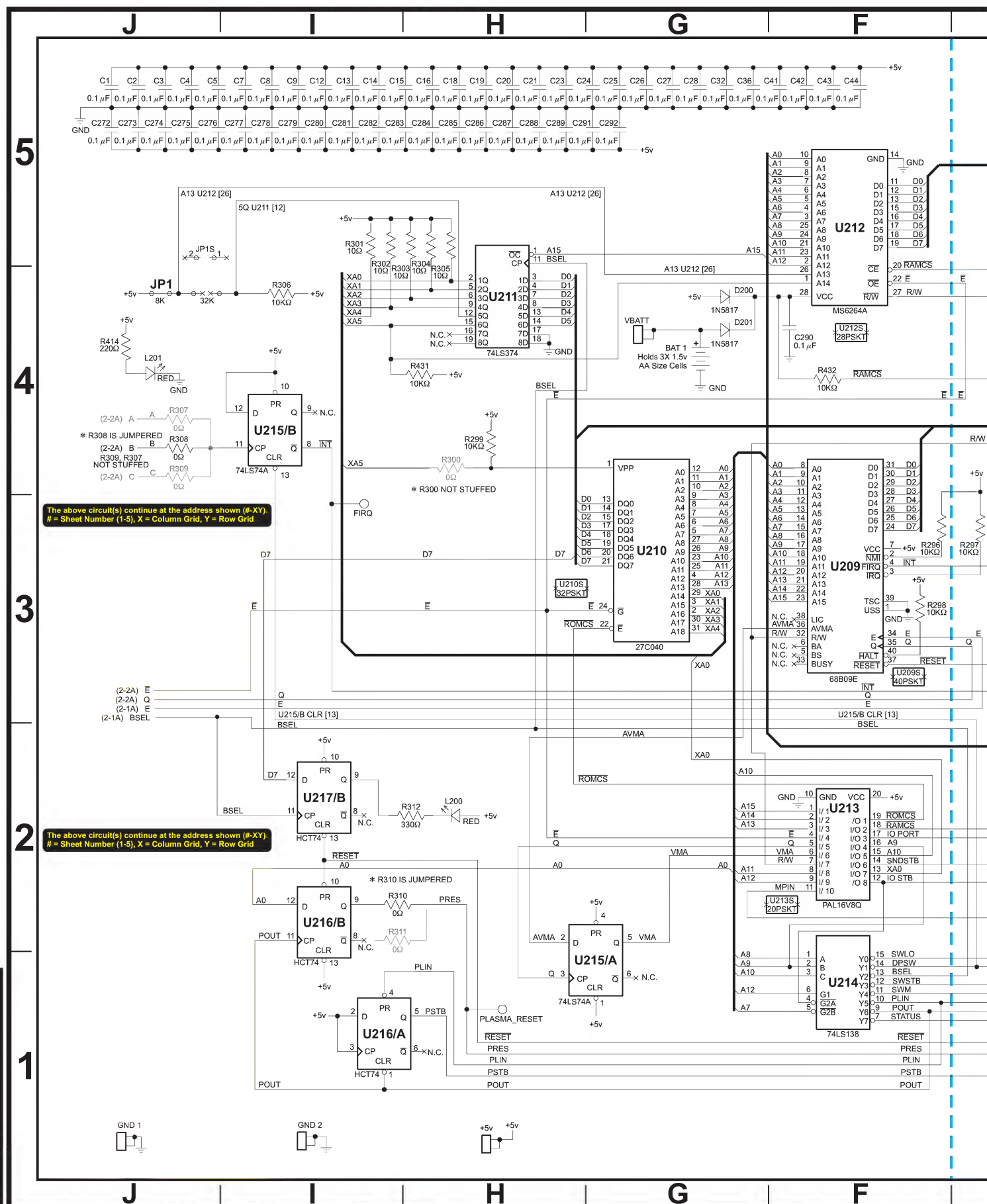
E & Q - The CPU signals for both **68B09E** processors. Should be at 2Mhz with **Q** leading **E** by **500 nsec**.

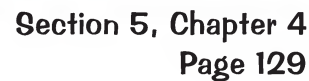
24Mhz - The oscillator used for the **BSMT** & derivation of **E & Q**.

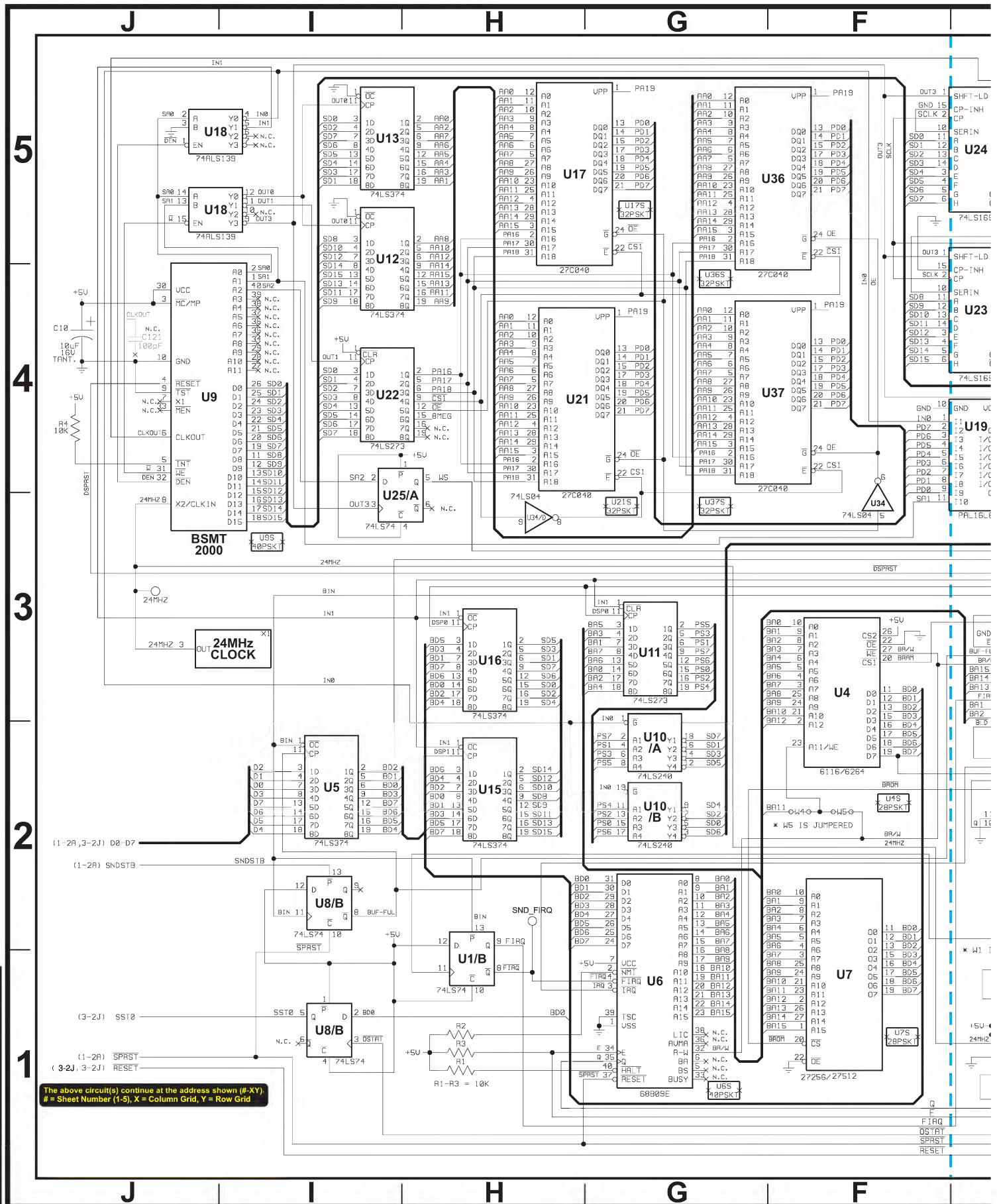
SND-FIRQ - The sound sections **CPU Interrupt**.

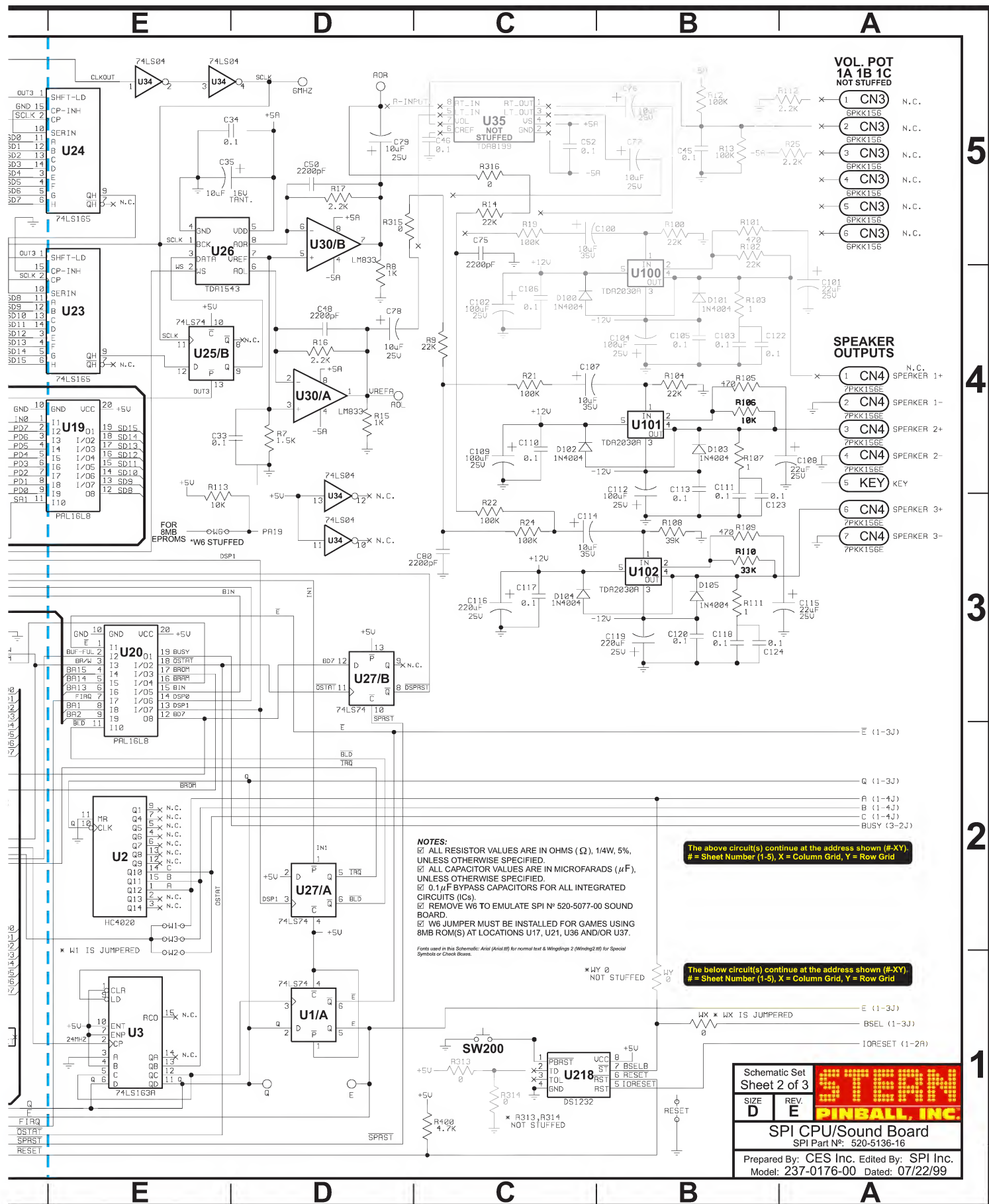
6Mhz - This clock is generated internally on the **BSMT** and is used for shifting the data samples into the **DAC**.

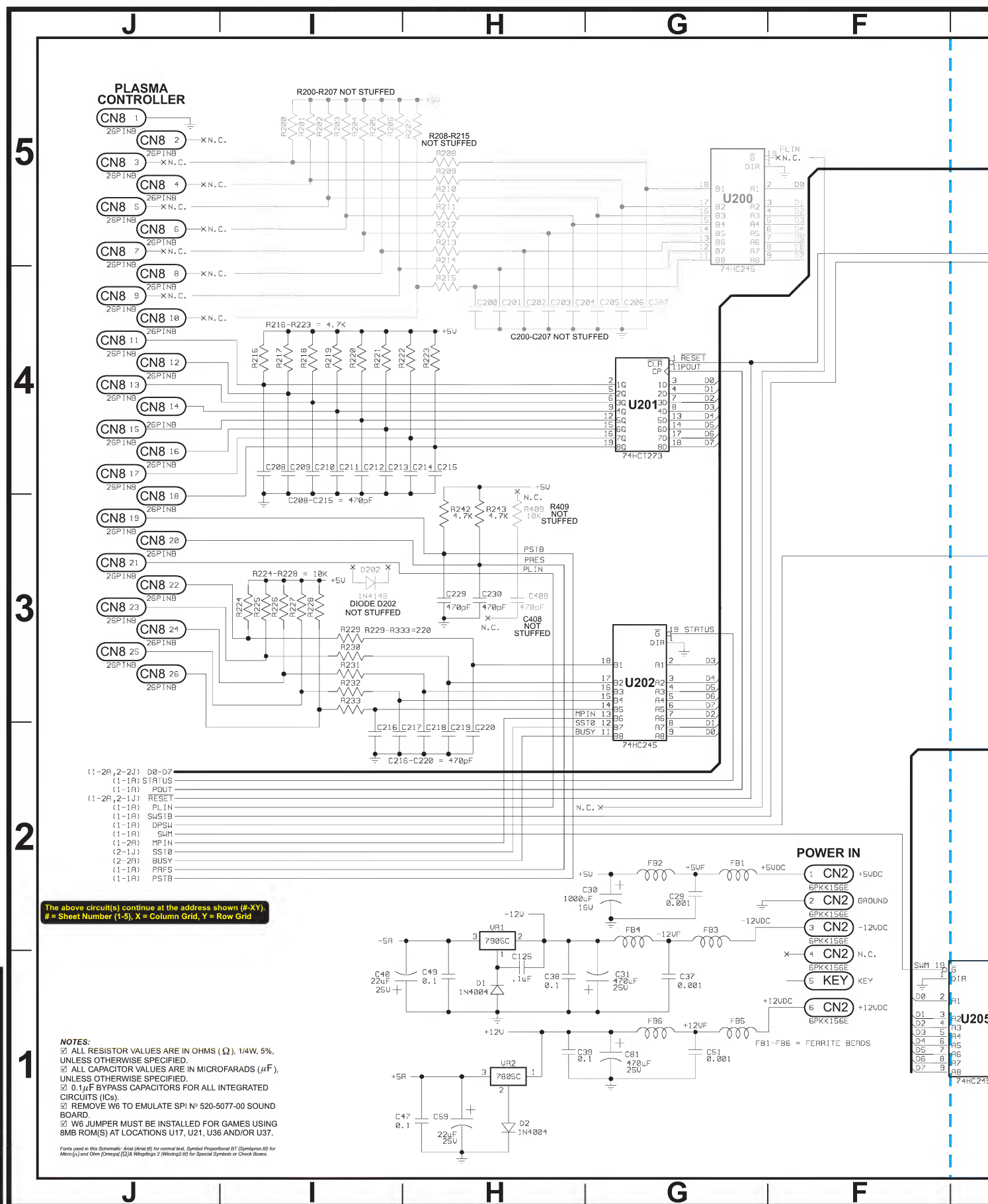
W6 Jumper - This jumper must be installed for games that use **8MB** Sound EPROMs (**U17 U21 U36 U37**). For games which use **4MB** Sound EPROMs this jumper is not installed but will operate on boards with **W6** installed.





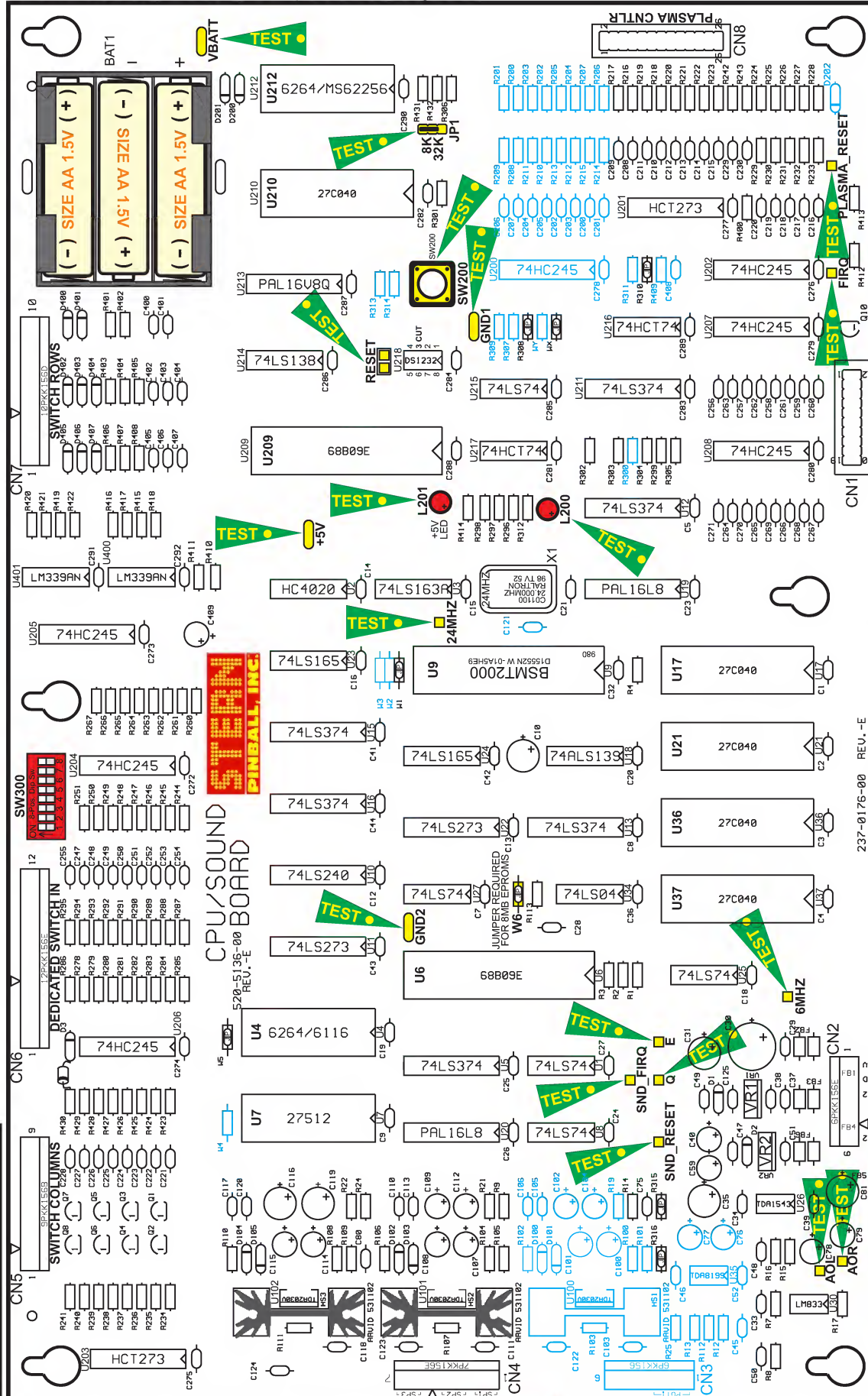








CPU/Sound Board Component Layout



- Test Points:**
- ← VBATT
 - ← 8K/32K JUMPER JP1
 - ← PLASMA_RESET
 - ← FIRO SW200
 - ← GND1
 - ← RESET
 - LEDs :
 - ← L201+5v & L200
 - ← +5V
 - ← 24MHZ
 - REQUIRED FOR 8MB EPROM USE
 - ← W6 JUMPER
 - ← GND2
 - ← 6MHZ
 - ← E
 - ← SND_FIRQ & Q
 - ← SND_RESET
 - ← AOL & AOR

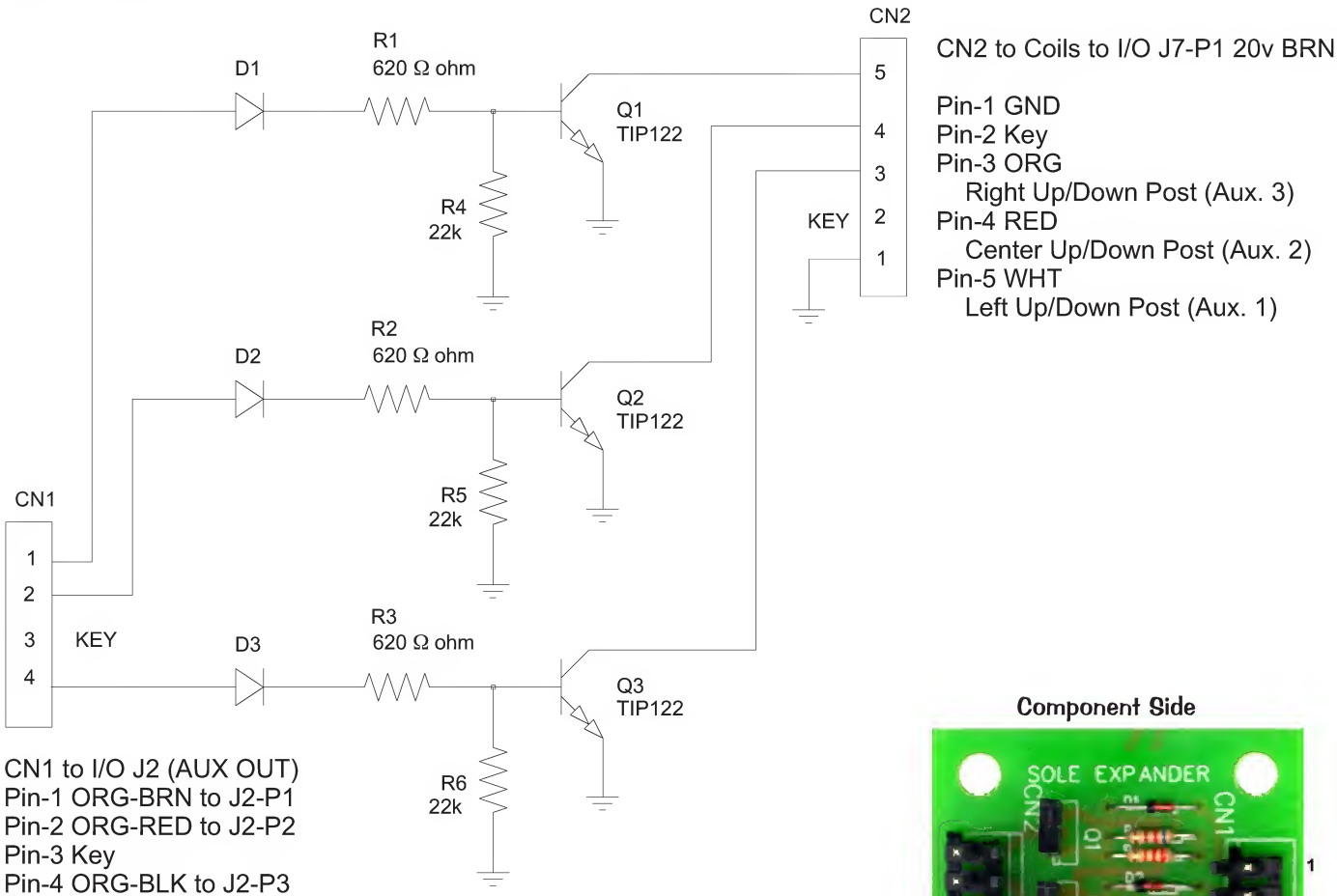
Sec. 5: PCBs



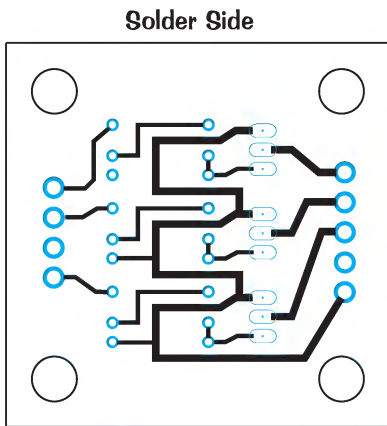
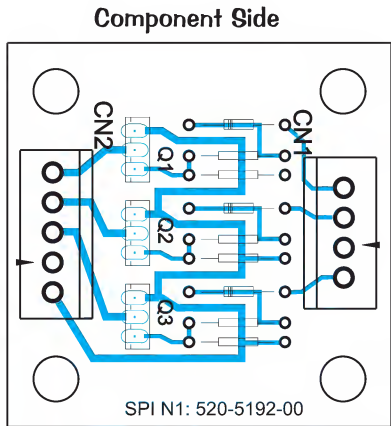
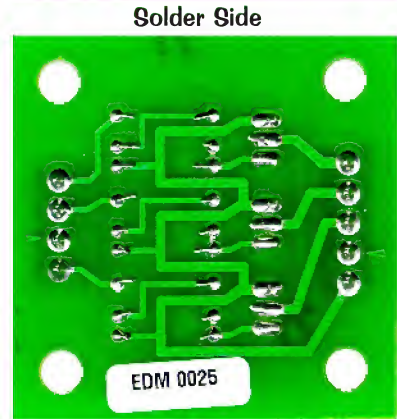
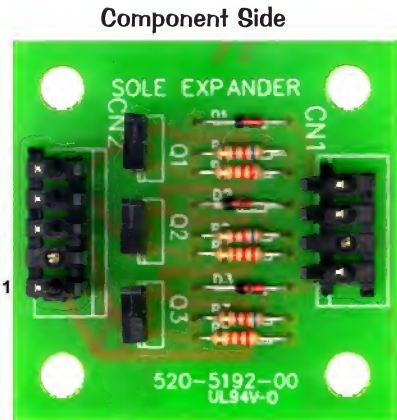
CPU/Sound Board Parts

ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION (NS = Not Stuffed)
—	1	520-5136-16	CPU/Sound Board Mono (FCC FEB98)	Complete PCB Assembly
01	1	545-5685-00	BAT1 HOLDER	(Always replace all 3, Size AA 1.5v Cells, with new ones, when required)
02	79	125-5031-00	C1, C2, C3, C4, C5, C7, C8, C9, C12, C13, C14, C15, C16, C18, C19, C20, C21, C23, C24, C25, C26, C28, C32, C33, C34, C36, C38, C39, C41, C42, C43, C44, C47, C49, C110, C111, C113, C117, C118, C120, C123, C124, C125, C255, C272, C273, C274, C275, C276, C277, C279, C280, C281, C282, C283, C284, C285, C286, C287, C288, C289, C290, C291, C292, C400>C401, C402>C404, C405>C407	(C45, C46, C52, C103, C105, C106, C122: NS)
03	2	125-5017-00	C10, C35	10uF, 16v, Radial Tant. Cap.
04	3	125-5043-00	C29, C37, C51	0.001uF, (102), Cap.
05	1	125-5037-00	C30	1000uF, 16v, Radial Lytic Cap.
06	2	125-5019-00	C31, C81	470uF, 25v, Radial Lytic Cap.
07	4	125-5020-00	C40, C59, C108, C115	(C76, C77, C101: NS)
08	4	125-5039-00	C48, C50, C75, C80	22uF, 25v, Radial Lytic Cap.
09	6	125-5017-00	C78, C79, C107, C114	(C100: NS)
10	2	125-5015-00	C109, C112	(C102, C104: NS)
11	2	125-5012-00	C116, C119	(C121: NS)
12	0	125-5038-00		
13	44	125-5028-00	C208>C215, C216>C220, C229, C230, C247>C254, C256>C263, C264>C271	(C200>C207: NS)
14	8	125-5029-00	C221>C228	(C408: NS)
15	1	125-5014-00	C409	0.01uF, (103), 100v Cap.
16	1	045-5015-01	CN1	22uF, 16v, Radial Lytic Cap.
17	1	045-5015-06	CN2 (Key Pin-5)	20-Pin, 0.1 HEADER
18	1	045-5015-07	CN4 (Key Pin-5)	6PKK156
19	1	045-5013-00	CN5 (Key Pin-2)	7PKK156
20	1	045-5015-00	CN6 (Key Pin-5)	9PKK156
21	1	045-5014-01	CN7 (Key Pin-4)	12PKK156
22	1	045-5015-26	CN8	10PKK156
23	7	112-5003-00	D1, D2, D3, D102, D103, D104, D105	26-Pin, 0.1 HEADER
24	2	112-5008-00	D200, D201	1N4004, Diode
25	8	112-0054-00	D400, D401, D402>D404, D405>D407	1N5817, Diode
26	6	n/a	(FB1)-FB2, FB3-(FB4), (FB5)-FB6	1N4148, Diode
27	1	165-5099-00	L200, L201	Ferrite Bead (if required, call Tech Support)
28	10	110-0069-00	Q1>Q8, Q10	(Q9 Not Used)
29	36	121-5011-00	R1>R3, R4, R106, R113, R224>R228, R244>R251, R260>R267, R296>R298, R299, R301, R302>R305, R306, R413, R431>R432	(R200>R207, R409: NS)
30	1	121-5018-00	R7	1.5K Ω 1/4W Res.
31	5	121-5023-00	R9, R14, R104	(R100, R102: NS)
32	20	121-5009-00	R15, R8, R234>R241, R278>R286, R412	22K Ω 1/4W Res.
33	2	121-5043-00	R16, R17	(R25, R112: NS)
34	3	121-5051-00	R21, R22, R24	(R12, R13, R19: NS)
35	2	121-5046-00	R105, R109	(R101: NS)
36	2	121-5009-00	R107, R111	(R103: NS)
37	9	121-5045-00	R108, R287>R294	1K Ω 1/4W Res.
38	11	121-5021-00	R216>R223, R242, R243, R400	39K Ω Res.
39	15	121-5033-00	R229>R233, R295, R414, R415>R422	(R208>R215: NS)
40	5	n/a	R308, R310, R315>R316, WX	(R300, R307, R309, R311, R313>R314, WX: NS) 0 Ω Jumper Wire (24ga.)
41	1	121-5036-00	R312	330 Ω 1/4W Res.
42	16	121-5047-00	R401>R402, R403>R405, R406>R408, R423>R430	560 Ω 1/4W Res.
43	2	121-5048-00	R410, R411	3.3K Ω 1/4W Res.
44	1	n/a	SW200	B3F4000
45	1	181-5002-00	SW300	8-Pin, Dip Switch
46	5	100-0037-00	U1, U8, U25, U27, U215	74LS74
47	1	100-0249-00	U2	74HC4020
48	1	100-0049-00	U3	74LS163
49	1	105-0052-05	U4	6116 RAM
50	3	077-5208-00	U4, U7, U212	28-Pin, IC Dip Socket
51	6	100-0064-00	U5, U12, U13, U15, U16, U211	74LS374
52	1	100-0189-01	U6, U209	68B09E
53	3	077-5209-00	U6, U9, U209	40-Pin, IC Socket
54	1	(See Pg. DR. Table)	U7	27512 EPROM
55	1	105-0116-00	U9	BSMT2000
56	1	100-0149-00	U10	74LS240
57	5	(See Pg. DR. Table)	U17, U21, U36, U37, U210	27C040 EPROM
58	5	077-5217-00	U17, U21, U36, U37, U210	32-Pin, IC Socket
59	1	100-0043-00	U18	74ALS139
60	1	965-0136-00	U19	PAL16L8 (Programmed) YELLOW DOT
61	1	965-0137-00	U20	WHITE DOT
62	2	100-0022-00	U22, U11	PAL16L8 (Programmed) WHITE DOT
63	2	100-5008-00	U23, U24	74LS273
64	1	100-5018-00	U26	74LS165
65	1	100-0375-00	U30	TDA1543
66	1	100-0027-00	U34	LM833
67	0	100-5016-00	(U35: NS)	74LS04
68	2	100-5016-20	U101, U102	(U100 : NS)
69	3	535-5000-10	U101 (HS2), U102 (HS3)	(U100 (HS1): NS)
70	2	100-5012-00	U201, U203	TDA2030A
71	6	100-0338-00	U202, U204, U205, U206, U207, U208	(U200: NS)
72	1	105-5046-00	U212	AAVID 531102 (Heat Sink)
73	1	965-6504-00	U213	74HCT273
74	1	100-0148-00	U214	74HC245
75	2	100-5015-00	U216, U217	MS6264A
76	1	100-5023-00	U218	PAL16L8 (Programmed) BLUE DOT
77	2	100-0377-00	U400, U401	74LS138
78	4	n/a	VBATT, +5v, GND1, GND2	HCT74
79	1	124-5002-00	VR1	DS1232
80	1	124-5001-00	VR2	LM339AN
81	6	n/a	W1, W5, W6* (*for 8MB EPROMs)	(W2-W3, W4: NS)
82	1	140-0011-00	X1	Test Point Wire (24ga.) Loops
83	12	n/a	AOR, AOL, SND_RESET, SND_FIRQ, Q, E, 6Mhz, 24Mhz, FIRQ, PLASMA_RESET, RESET (X2)	LM7905CT -5v Regulator
84	1	(call Tech.Support)	R110 (New Rev. Change Feb 02)	LM7805CT +5v Regulator

(UK Only) Solenoid Expander PC Board Schematic



(UK Only) Solenoid Exp. PCB Component Layout & Parts



Sec. 5: PCBs

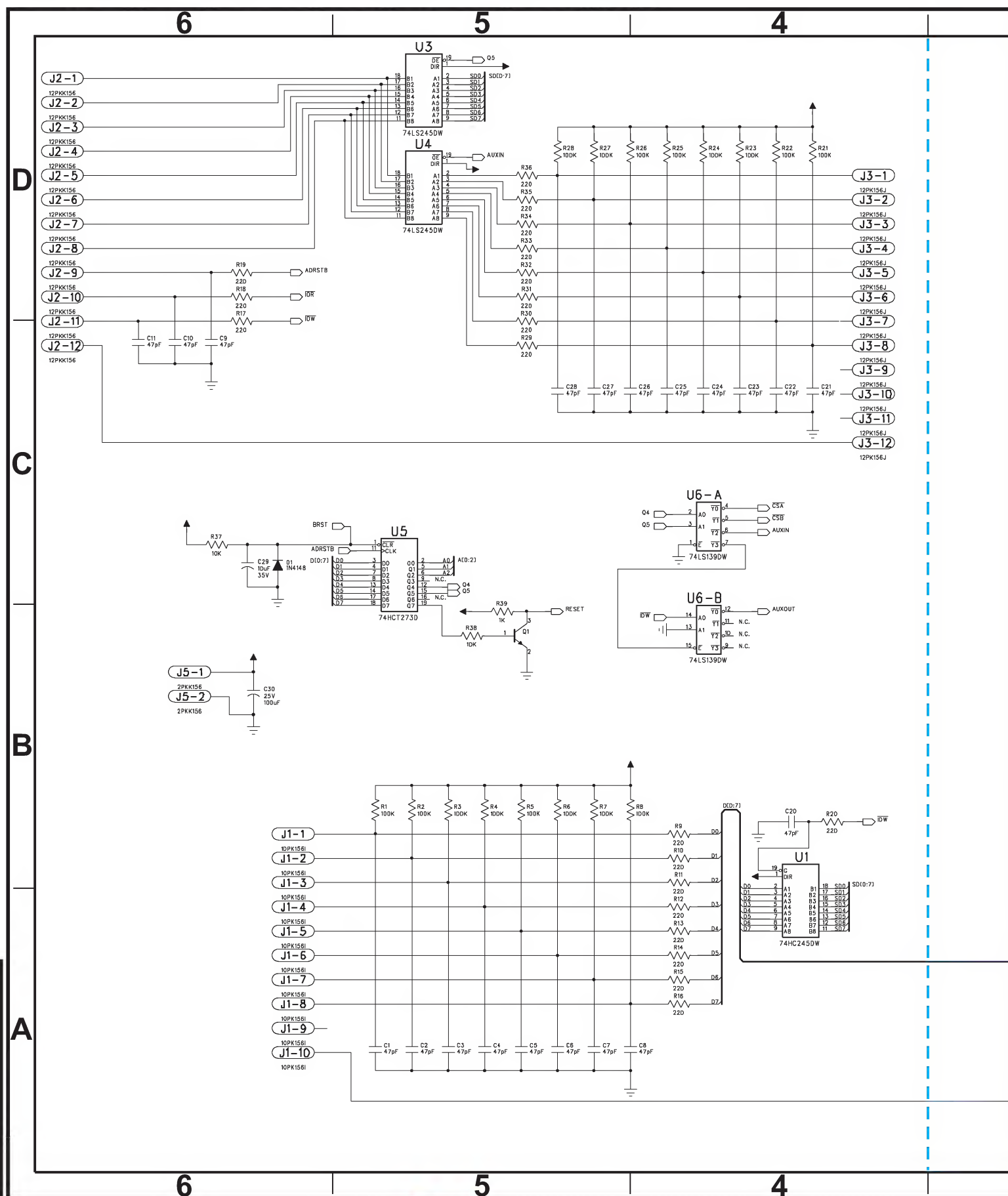
ITEM	QTY	PART NUMBER	REF-DESIGNATOR
1	1	520-5192-00	Solenoid Expander PC Board
2	1		CN1
3	3	112-5014-00	D1, D2, D3
4	3	121-5003-00	R1, R2, R3
5	3	121-5042-00	R4, R5, R6
6	3	110-0067-00	Q1, Q2, Q3
7	1	036-5479-00-76	Not Shown

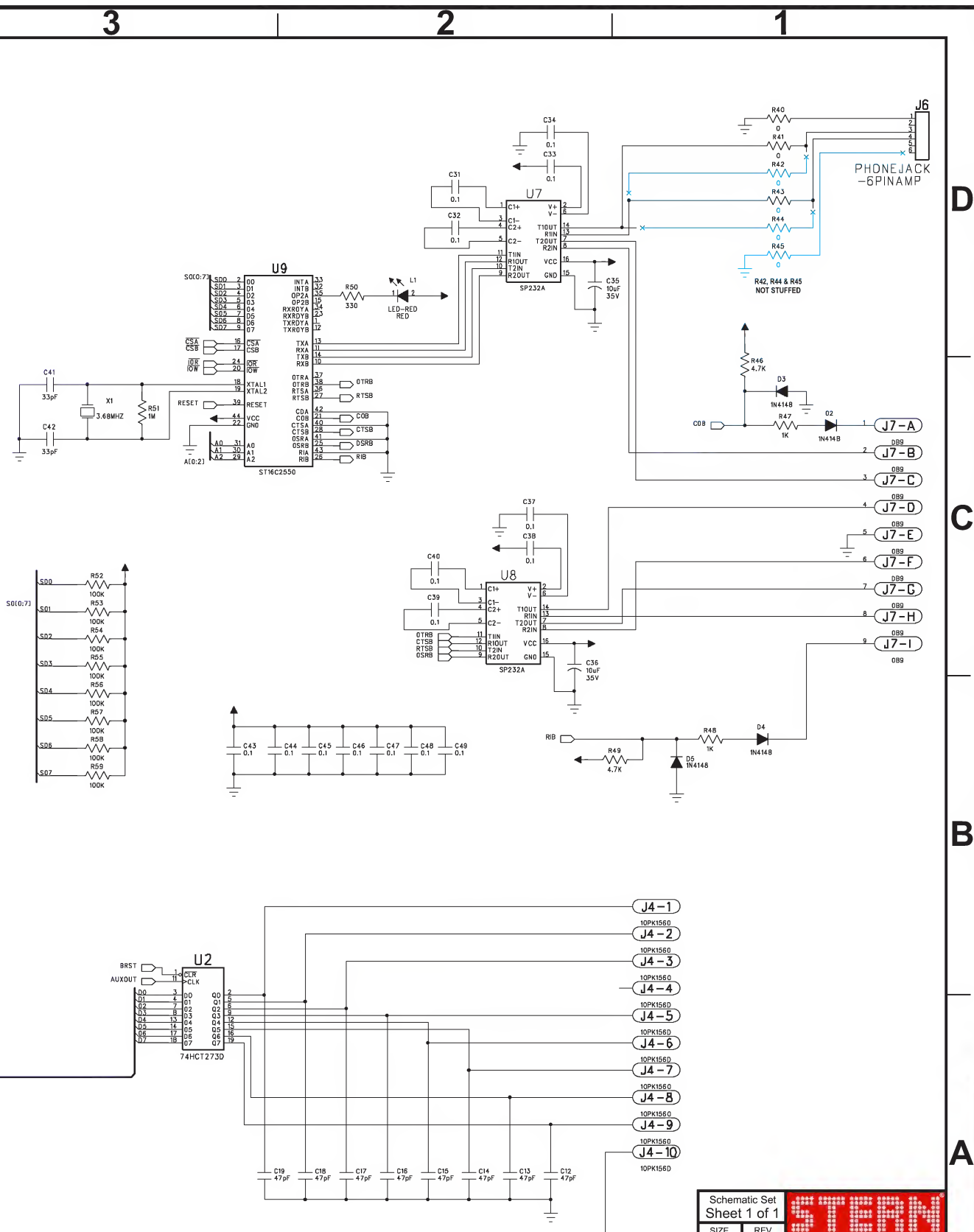
DESCRIPTION
Complete PCB Assembly
Connector, 4X .156"
Connector, 5X .156"
1N914, Signal Diode
620Ω 1/4W CF Resistor
22KΩ 1/4W CF Resistor
Tip122 (NPN Darl. Transistor)
UK Post Cable Wiring Harness




Order the Optional ToPS™ (Tournament Pinball System) Kit!
Call Technical Support at 1-800-542-5377 for more information
TOURNAMENT PINBALL SYSTEM

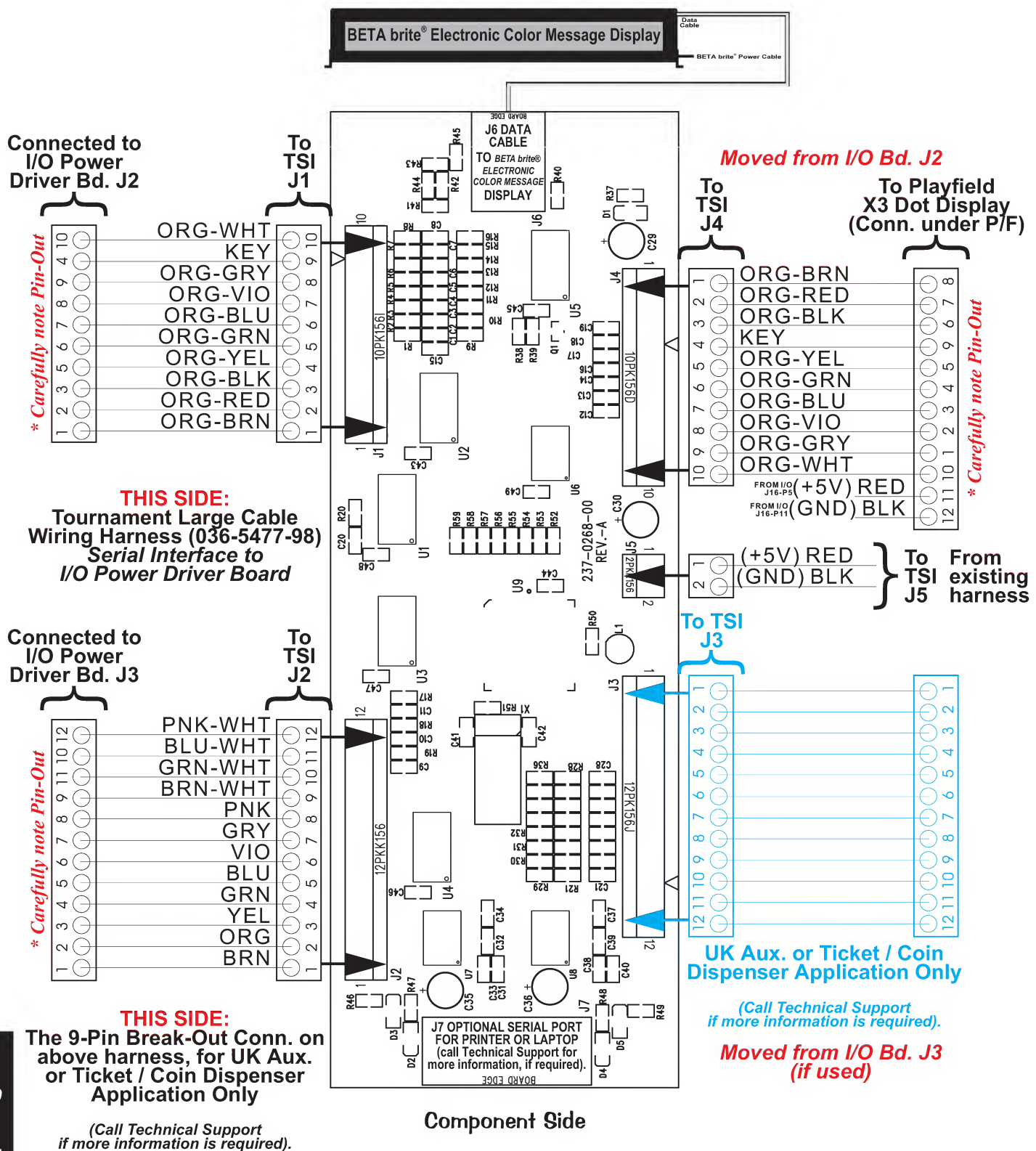
Tournament Serial Interface Board Schematic (Sheet 1 of 1)





Schematic Set Sheet 1 of 1		STERN PINBALL, INC.
SIZE D	REV. A	
SPI Tournament Serial Interface Bd. SPI Part No: 520-5220-00		
Prepared By: CES Inc. Edited By: SPI Inc. Model: 237-0268-00 Dated: 08/2002		

Tournament Serial Interface Board Component Layout & Parts



Sec. 5: PCBs

ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION
--	1	520-5220-00	Tournament Serial Interface (TSI) Board	PCB Assembly



Appendixes A through J

Appendix Table of Contents

- **Appendix A, Pinball Game Firmware Table A1-A2**
...describes the EPROM with its chip size, the Stern™ Pinball, Inc. (SPI) Part N^o, version (if applicable), and CPU Board & CPU/Sound Board Pin location(s).
- **Appendix B, Semi-Conductors / I.C.'s / Relays Cross-Reference Table B1**
...describes diodes and transistors with Source N^o, SPI Part N^o, NTE N^o, ECG N^o, Radio Shack N^o & RCA Part N^o (If applicable).
- **Appendix C, Game Mfg. Date, Manual Part N^o & CPU Jumper Table C1**
...provides the Game Manufactured Date & Manual Part N^o, the CPU version, the EPROM Position, Jumpers Installed and Jumpers Removed (games specified).
- **Appendix D, Board Type Table D1-D2**
...provides Board Part N^os for Games Laser War through Batman Forever (Flipper, Sound, Power Supply, Dot Matrix Display, Display Controller & OPTOs) and the White Star Board System, Games Apollo 13 through current (Flipper*, I/O Power Driver, CPU/Sound, Display Power Supply, Dot Matrix Display, Display Controller & OPTOs; *Flipper Board with the White Star Bd. System for A13 & Golden Eye only.)
- **Appendix E, Generic Coil Cross-Reference Guide & Flipper Coil Table E1-E2**
...provides the Coils used with Part N^o and Gauge-Turns (of the coil).
- **Appendix F, Motor Specification Table F1-F2**
...provides all the Motor Function, Specifications and Part N^o for Games Laser War through current.
- **Appendix G, Part Number Prefix Classification Codes..... G1**
...explains how our Part Numbers are developed to help sort parts easier.
- **Appendix H, Playfield Inserts (Plastic Light Covers) H1**
...gives a pictoral view with the name and Part N^o of all the inserts used (also gives the Color Code Chart).
- **Appendix I, Stand-Up Targets (Happ Modular & Regular) I1**
...gives a pictoral view with the name and Part N^o of all the Single Stand-Up Targets used (also gives the Color Code Chart).
- **Appendix J, Coin Cards (USA & International) J1**
...gives a pictoral view with the name and Part N^o of all the current Coin Cards for USA, Canada, Euro and other International Countries.
- **Glossary of Terms..... Last Page**
...gives definitions or explanations of some pinball terms and acronyms.
- **Limited Warranty, Cautions, Warnings & Notices Last Page**

APPENDIX A

Pinball Game Firmware Table

EPROM	Chip Size	Program Part N°	USA Ver.	Bd. Loc.	Raw Part N°
Laser War					
CPU	(256K)	965-0004-00	LWAR.C5	C5	960-5007-00
Sound (Old)	(256K)	965-0005-00		J5	960-5007-00
Sound (Old)	(256K)	965-0006-00		J6	960-5007-00
Sound (Old)	(256K)	965-0007-00		J7	960-5007-00
- OR -					
Sound	(256K)	965-0008-00		7F	960-5007-00
Sound 1	(512K)	965-0009-00		6F	960-7001-02
Sound 2	(512K)	965-0010-00		4F	960-7001-02
Secret Service					
CPU	(256K)	965-0011-00	A4-6	B5	960-5007-00
CPU	(256K)	965-0012-00	A4-6	C5	960-5007-00
Voice 1	(512K)	965-0014-00		6F	960-7001-02
Voice 2	(512K)	965-0015-00		4F	960-7001-02
Sound	(256K)	965-0013-00		7F	960-5007-00
Torpedo Alley					
CPU	(256K)	965-0016-00	A2-1	B5	960-5007-00
CPU	(256K)	965-0017-00	A2-1	C5	960-5007-00
Voice 1	(512K)	965-0019-00		6F	960-7001-02
Voice 2	(512K)	965-0020-00		4F	960-7001-02
Sound	(256K)	965-0018-00		7F	960-5007-00
Time Machine					
CPU	(128K)	965-0021-00	A2-4	B5	960-5006-00
CPU	(256K)	965-0022-00	A2-4	C5	960-5007-00
Voice 1	(512K)	965-0024-00		6F	960-7001-02
Voice 2	(512K)	965-0025-00		4F	960-7001-02
Sound	(256K)	965-0023-00		7F	960-5007-00
Playboy 35th Anniversary					
CPU	(256K)	965-0046-00	A2-4	B5	960-5007-00
CPU	(256K)	965-0047-00	A2-4	C5	960-5007-00
Voice 1	(512K)	965-0049-00		6F	960-7001-02
Voice 2	(512K)	965-0050-00		4F	960-7001-02
Sound	(256K)	965-0048-00		7F	960-5007-00
ABC Monday Night Football					
CPU	(128K)	965-0031-00	A2-7	B5	960-5006-00
CPU	(256K)	965-0032-00	A2-7	C5	960-5007-00
Voice 1	(512K)	965-0034-00		6F	960-7001-02
Voice 2	(512K)	965-0035-00		4F	960-7001-02
Sound	(256K)	965-0033-00		7F	960-5007-00
Robocop					
CPU	(256K)	965-0036-00	A3-4	B5	960-5007-00
CPU	(256K)	965-0037-00	A3-4	C5	960-5007-00
Voice 1	(512K)	965-0039-00		6F	960-7001-02
Voice 2	(512K)	965-0040-00		4F	960-7001-02
Sound	(256K)	965-0038-00		7F	960-5007-00
Phantom of the Opera					
CPU	(128K)	965-0026-00	A3-2	B5	960-5006-00
CPU	(256K)	965-0027-00	A3-2	C5	960-5007-00
Voice 1	(512K)	965-0029-00		6F	960-7001-02
Voice 2	(512K)	965-0030-00		4F	960-7001-02
Sound	(256K)	965-0028-00		7F	960-5007-00
Back to the Future					
CPU	(256K)	965-0041-00	A2-0	B5	960-5007-00
CPU	(256K)	965-0042-00	A2-0	C5	960-5007-00
Voice 1	(512K)	965-0044-00		6F	960-7001-02
Voice 2	(512K)	965-0045-00		4F	960-7001-02
Sound	(256K)	965-0043-00		7F	960-5007-00
The Simpsons					
CPU	(128K)	965-0051-00	A2-7	B5	960-5006-00
CPU	(256K)	965-0052-00	A2-7	C5	960-5007-00
Voice 1	(512K)	965-0054-00		6F	960-7001-02
Voice 2	(512K)	965-0055-00		4F	960-7001-02
Sound	(256K)	965-0053-00		7F	960-5007-00
Checkpoint					
CPU	(128K)	965-0056-00	A1-7	B5	960-5006-00
CPU	(256K)	965-0057-00	A1-7	C5	960-5007-00
Voice 1	(1M)	965-0057-00		F7	960-5009-00
Voice 2	(1M)	965-0058-00		F5	960-5009-00
Sound	(256K)	965-0059-00		F4	960-5007-00
Display	(512K)	965-0060-00	CP80	U8	960-7001-02
Teenage Mutant Ninja Turtles					
CPU	(128K)	965-0061-00	A1.04	B5	960-5006-00
CPU	(256K)	965-0062-00	A1.04	C5	960-5007-00
Voice 1	(1M)	965-0063-00		F5/6	960-5009-00
Voice 2	(1M)	965-0064-00		F4/5	960-5009-00
Sound	(256K)	965-0065-00		F7	960-5007-00
Display	(512K)	965-0066-00	A1.04	U8	960-7001-02
Batman					
CPU	(128K)	965-0067-00	A1.06	B5	960-5006-00
CPU	(256K)	965-0135-00	A1.06	C5	960-5007-00
Voice 1	(2M)	965-0068-00		U17	960-5010-00
Voice 2	(2M)	965-0069-00		U21	960-5009-00
Sound	(256K)	965-0070-00		U7	960-5007-00
Display	(1M)	965-0071-00	A1.06	U8	960-5009-00
Star Trek 25th Anniversary					
CPU	(512K)	965-0072-00	A2.01	C5	960-7001-02
Voice 1	(2M)	965-0073-00		U17	960-5010-00
Voice 2	(2M)	965-0074-00		U21	960-5010-00
Sound	(256K)	965-0075-00		U7	960-5007-00
Display	(1M)	965-0076-00	A1.09	U8	960-5009-00
Hook					
CPU	(512K)	965-0077-00	A4.08	C5	960-7001-02
Voice 1	(2M)	965-0078-00		U17	960-5010-00
Voice 2	(2M)	965-0079-00		U21	960-5010-00
Sound	(256K)	965-0080-00		U7	960-5007-00
Display	(1M)	965-0081-00	A4.01	U8	960-5009-00

EPROM	Chip Size	Program Part N ^o	USA Ver.	Bd. Loc.	Raw Part N ^o
Lethal Weapon 3					
CPU	(512K)	965-0082-00	A2.08	C5	960-7001-02
Voice 1	(2M)	965-0083-00		U17	960-5015-00
Voice 2	(2M)	965-0084-00		U21	960-5010-00
Sound	(256K)	965-0085-00		U7	960-5007-00
Display	(2M)	965-0086-00	A2.06	ROM 0	960-5010-00
Display	(2M)	965-0087-00	A2.06	ROM 1	960-5010-00
(Used on Display PCB 520-5055-00)					
-OR-					
Display	(4M)	965-0087-04	A2.06	ROM 0	960-5015-00
(Used on Display PCB 520-5055-01)					
Star Wars					
CPU	(512K)	965-0119-00	A1.03	C5	960-7001-02
Voice 0	(4M)	965-0132-00		U17	960-5015-00
Voice 1	(2M)	965-0133-00		U21	960-5010-00
Sound	(256K)	965-0131-00		U7	960-5007-00
Display	(2M)	965-0120-00	A1.04	ROM 0	960-5010-00
Display	(2M)	965-0121-00	A1.04	ROM 1	960-5010-00
(Used on Display PCB 520-5055-00)					
-OR-					
Display	(4M)	965-0122-00	A1.05	ROM 0	960-5015-00
(Used on Display PCB 520-5055-01)					
Rocky & Bullwinkle & Friends					
CPU	(512K)	965-0138-00	A1.30	C5	960-7001-02
Voice 0	(4M)	965-0139-00		U17	960-5015-00
Voice 1	(2M)	965-0140-00		U21	960-5010-00
Sound	(256K)	965-0141-00		U7	960-5007-00
Display	(4M)	965-0142-00	A1.30	ROM 0	960-5015-00
Jurassic Park					
CPU	(512K)	965-0143-00	A5.13	C5	960-7001-02
Voice 0	(4M)	965-0144-00		U17	960-5015-00
Voice 1	(2M)	965-0145-00		U21	960-5010-00
Sound	(256K)	965-0146-00		U7	960-5007-00
Display	(4M)	965-0147-00	A5.10	ROM 0	960-5015-00
Last Action Hero					
CPU	(512K)	965-0148-00	A1.12	C5	960-7001-02
Voice 0	(4M)	965-0149-00		U17	960-5015-00
Voice 1	(2M)	965-0150-00		U21	960-5010-00
Sound	(256K)	965-0151-00		U7	960-5007-00
Display	(4M)	965-0152-00	A1.06	ROM 0	960-5015-00
Tales from the Crypt					
CPU	(512K)	965-0157-00	A3.03	C5	960-7001-02
Voice 0	(4M)	965-0158-00		U17	960-5015-00
Voice 1	(2M)	965-0159-00		U21	960-5010-00
Sound	(256K)	965-0160-00		U7	960-5007-00
Display	(4M)	965-0161-00	A3.01	ROM 0	960-5015-00
The Who's Tommy					
CPU	(512K)	965-0162-00	A4.00	C5	960-7001-02
Voice 1	(4M)	965-0165-00		U17	960-5015-00
Voice 2	(4M)	965-0166-00		U21	960-5015-00
Voice 3	(4M)	965-0167-00		U36	960-5015-00
Voice 4	(4M)	965-0168-00		U37	960-5015-00
Sound	(512K)	965-0164-00		U7	960-7001-02
Display	(4M)	965-0163-00	A4.00	ROM 0	960-5015-00
WWF Royal Rumble					
CPU	(512K)	965-0169-00	A1.06	C5	960-7001-02
Voice 1	(4M)	965-0172-00		U17	960-5015-00
Voice 2	(4M)	965-0173-00		U21	960-5015-00
Voice 3	(4M)	965-0174-00		U36	960-5015-00
Sound	(512K)	965-0171-00		U7	960-7001-02
Display	(4M)	965-0170-00	A1.02	ROM 0	960-5015-00
Guns N' Roses					
CPU	(512K)	965-0175-00	A3.00	C5	960-7001-02
Voice 1	(4M)	965-0178-00		U17	960-5015-00
Voice 2	(4M)	965-0179-00		U21	960-5015-00
Voice 3	(4M)	965-0180-00		U36	960-5015-00
Voice 4	(4M)	965-0181-00		U37	960-5015-00
Sound	(512K)	965-0177-00		U7	960-7001-02
Display	(4M)	965-0176-00	A3.00	ROM 0	960-5015-00
Maverick *					
CPU	(512K)	965-0182-00	A4.04	C5	960-7001-02
Voice 1	(4M)	965-0186-00		U17	960-5015-00
Voice 2	(4M)	965-0187-00		U21	960-5015-00
Voice 3	(4M)	965-0187-01		U36	960-5015-00
Sound	(512K)	965-0185-00		U7	960-7001-02
Display*	(4M)	965-0183-00	A4.01	ROM 0	960-5015-00
Display*	(4M)	965-0184-00	A4.01	ROM 3	960-5015-00
Mary Shelley's Frankenstein *					
CPU	(512K)	965-0188-00	A1.03	C5	960-7001-02
Voice 1	(4M)	965-0192-00		U17	960-5015-00
Voice 2	(4M)	965-0193-00		U21	960-5015-00
Voice 3	(4M)	965-0194-00		U36	960-5015-00
Sound	(512K)	965-0191-00		U7	960-7001-02
Display*	(4M)	965-0189-00	A1.03	ROM 0	960-5015-00
Display*	(4M)	965-0190-00	A1.03	ROM 3	960-5015-00
Baywatch * (CPU Board 520-5003-04)					
CPU	(512K)	965-0195-00	A4.00	C5	960-7001-02
Voice 1	(4M)	965-0196-00		U17	960-5015-00
Voice 2	(4M)	965-0197-00		U21	960-5015-00
Sound	(512K)	965-0199-00		U7	960-7001-02
Display*	(4M)	965-0200-00	A4.00	ROM 0	960-5015-00
Display*	(4M)	965-0201-00	A4.00	ROM 3	960-5015-00
Batman Forever * (CPU Board 520-5003-04)					
CPU	(512K)	965-0202-00	A3.02	C5	960-7001-02
Voice 1	(4M)	965-0203-00		U17	960-5015-00
Voice 2	(4M)	965-0204-00		U21	960-5015-00
Sound	(512K)	965-0205-00		U7	960-7001-02
Display*	(4M)	965-0206-00	A3.00	ROM 0	960-5015-00
Display*	(4M)	965-0207-00	A3.00	ROM 3	960-5015-00



APPENDIX A



Pinball Game Firmware (for White Star Board System) Table

ROM	Chip Size	Program Part N°	USA Ver. & Check Sum	Bd. Loc.	Raw Part N°
Apollo 13 (Note 1)					
Game ROM	(1M)	965-0208-00	A5.01 \$09FF	U210	960-5009-00
Sound	(512K)	965-0212-00		U7	960-7001-02
Display	(4M)	965-0213-00	A5.00 \$B92B	ROM 0	960-5015-01
Voice 1	(4M)	965-0209-00		U17	n/a (masked)
Voice 2	(4M)	965-0210-00		U21	n/a (masked)
Voice 3	(4M)	965-0211-00		U36	n/a (masked)
Golden Eye (Note 1)					
Game ROM	(1M)	965-0214-42	A4.04 \$3FFF	U210	960-5009-00
Sound	(512K)	965-0217-42		U7	960-7001-02
Display	(4M)	965-0218-42	A4.00 \$E6ED	ROM 0	960-5015-01
Voice 1	(4M)	965-0215-42		U17	n/a (masked)
Voice 2	(4M)	965-0216-42		U21	n/a (masked)
Twister (Note 2)					
Game ROM	(1M)	965-0219-41	A4.05 \$E9FF	U210	960-5009-00
Sound	(512K)	965-0221-41		U7	960-7001-02
Display	(4M)	965-0222-41	A4.01 \$FD01	ROM 0	960-5015-01
Voice 1	(4M)	965-0220-41		U17	960-5015-01
Voice 2	(4M)	965-0223-41		U21	960-5015-01
ID4: Independence Day (Note 2)					
Game ROM	(1M)	965-0224-45	A2.02 \$9CFF	U210	960-5009-00
Sound	(512K)	965-0227-45		U7	960-7001-02
Display	(4M)	965-0228-45	A2.00 \$ABF7	ROM 0	960-5015-01
Voice 1	(4M)	965-0225-45		U17	960-5015-01
Voice 2	(4M)	965-0226-45		U21	960-5015-01
Space Jam (Note 2)					
Game ROM	(1M)	965-0229-43	A3.00 \$E6FF	U210	960-5009-00
Sound	(512K)	965-0233-43		U7	960-7001-02
Display	(4M)	965-0234-43	A3.00 \$0057	ROM 0	960-5015-01
Voice 1	(4M)	965-0230-43		U17	960-5015-01
Voice 2	(4M)	965-0231-43		U21	960-5015-01
Voice 3	(4M)	965-0232-43		U36	960-5015-01
The Star Wars Trilogy - Special Edition (S.E.) (Note 2)					
Game ROM	(1M)	965-0235-56	A4.03 \$5EFF	U210	960-5009-00
Sound	(512K)	965-0238-56		U7	960-7001-02
Display	(4M)	965-0239-56	A4.00 \$8817	ROM 0	960-5015-01
Voice 1	(4M)	965-0236-56		U17	960-5015-01
Voice 2	(4M)	965-0237-56		U21	960-5015-01
The Lost World: Jurassic Park (Note 2)					
Game ROM	(1M)	965-0240-53	A2.02 \$C8FF	U210	960-5009-00
Sound	(512K)	965-0243-53		U7	960-7001-02
Display	(4M)	965-0244-53	A2.01 \$7F46	ROM 0	960-5015-01
Voice 1	(4M)	965-0241-53		U17	960-5015-01
Voice 2	(4M)	965-0242-53		U21	960-5015-01
The X-Files (Note 2)					
Game ROM	(1M)	965-0245-46	A3.03 \$A2FF	U210	960-5009-00
Sound	(512K)	965-0248-46		U7	960-7001-02
Display	(4M)	965-0249-46	A3.00 \$66D0	ROM 0	960-5015-01
Voice 1	(4M)	965-0246-46		U17	960-5015-01
Voice 2	(4M)	965-0247-46		U21	960-5015-01
Starship Troopers (Note 3)					
Game ROM	(1M)	965-0250-59	A2.01 \$85FF	U210	960-5009-00
Sound	(512K)	965-0253-59		U7	960-7001-02
Display	(4M)	965-0254-59	A2.00 \$E77B	ROM 0	960-5015-01
Voice 1	(4M)	965-0251-59		U17	960-5015-01
Voice 2	(4M)	965-0252-59		U21	960-5015-01
Voice 3	(4M)	965-0255-59		U36	960-5015-01
Viper Night Drivin' (Note 4)					
Game ROM	(1M)	965-0266-35	A2.01 \$C5FF	U210	960-5009-00
Sound	(512K)	965-0271-35		U7	960-7001-02
Display	(4M)	965-0272-35	A2.01 \$C17D	ROM 0	960-5015-01
Voice 1	(4M)	965-0267-35		U17	960-5015-01
Voice 2	(4M)	965-0268-35		U21	960-5015-01
Voice 3	(4M)	965-0269-35		U36	960-5015-01
Voice 4	(4M)	965-0270-35		U37	960-5015-01
Lost In Space (Note 4)					
Game ROM	(1M)	965-0282-60	A1.01 \$B2FF	U210	960-5009-00
Sound	(512K)	965-0287-60		U7	960-7001-02
Display	(4M)	965-0288-60	A1.02 \$32AB	ROM 0	960-5015-01
Voice 1	(4M)	965-0283-60		U17	960-5015-01
Voice 2	(4M)	965-0284-60		U21	960-5015-01
Voice 3	(4M)	965-0285-60		U36	960-5015-01
Voice 4	(4M)	965-0286-60		U37	960-5015-01
Godzilla (Note 4)					
Game ROM	(1M)	965-0289-40	A2.05 \$B1FF	U210	960-5009-00
Sound	(512K)	965-0294-40		U7	960-7001-02
Display	(4M)	965-0295-40	A2.00 \$C929	ROM 0	960-5015-01
Voice 1	(4M)	965-0290-40		U17	960-5015-01
Voice 2	(4M)	965-0291-40		U21	960-5015-01
Voice 3	(4M)	965-0292-40		U36	960-5015-01
Voice 4	(4M)	965-0293-40		U37	960-5015-01
South Park (Notes 4, 5)					
Game ROM	(1M)	965-0301-71	A1.03 \$58FF	U210	960-5009-00
Sound	(512K)	965-0306-71		U7	960-7001-02
Display	(4M)	965-0307-71	A1.01 \$166F	ROM 0	960-5015-01
Voice 1	(8M)	965-0302-71		U17	960-5016-00
Voice 2	(8M)	965-0303-71		U21	960-5016-00
Voice 3	(8M)	965-0304-71		U36	960-5016-00
Voice 4	(8M)	965-0305-71		U37	960-5016-00
Harley-Davidson® (Notes 4, 5, 6)					
Game ROM	(1M)	965-0319-67	A1.03 \$3EFF	U210	960-5009-00
Sound	(512K)	965-0320-67		U7	960-7001-02
Display	(4M)	965-0321-67	A1.04 \$FC7C	ROM 0	960-5015-01
Voice 1	(8M)	965-0322-67	look for	U17	960-5016-00
Voice 2	(8M)	965-0323-67	updated code	U21	960-5016-00
Voice 3	(8M)	965-0324-67	in late 2002	U36	960-5016-00
Voice 4	(4M)	965-0325-67	for new HDs.	U37	960-5015-01

ROM	Chip Size	Program Part N°	USA Ver. & Check Sum	Bd. Loc.	Raw Part N°
Striker Xtreme (Notes 4, 5)					
Game ROM	(1M)	965-0326-68	A1.02 \$E4FF	U210	960-5009-00
Sound	(512K)	965-0327-68		U7	960-7001-02
Display	(4M)	965-0328-68	A1.03 \$1957	ROM 0	960-5015-01
Voice 1	(8M)	965-0329-68		U17	960-5016-00
Voice 2	(8M)	965-0330-68		U21	960-5016-00
Voice 3	(8M)	965-0331-68		U36	960-5016-00
Voice 4	(8M)	965-0332-68		U37	960-5016-00
NFL (Notes 4, 5)					
Game ROM	(1M)	965-0339-73	A1.00 \$D2FF	U210	960-5009-00
Sound	(512K)	965-0340-73		U7	960-7001-02
Display	(4M)	965-0341-73	A1.01 \$845A	ROM 0	960-5015-01
Voice 1	(8M)	965-0342-73	not on website:	U17	960-5016-00
Voice 2	(8M)	965-0343-73	code through	U21	960-5016-00
Voice 3	(8M)	965-0344-73	Distributor	U36	960-5016-00
Voice 4	(8M)	965-0345-73	only.	U37	960-5016-00
Sharkey's Shootout (Notes 4, 5)					
Game ROM	(1M)	965-0333-72	A2.11 \$49FF	U210	960-5009-00
Sound	(512K)	965-0334-72		U7	960-7001-02
Display	(4M)	965-0335-72	A2.01 \$6C33	ROM 0	960-5015-01
Voice 1	(8M)	965-0336-72		U17	960-5016-00
Voice 2	(8M)	965-0337-72		U21	960-5016-00
Voice 3	(8M)	965-0338-72		U36	960-5016-00
High Roller Casino (Notes 4, 5)					
Game ROM	(1M)	965-0346-65	A3.00 \$90FF	U210	960-5009-00
Sound	(512K)	965-0347-65		U7	960-7001-02
Display	(4M)	965-0348-65	A3.00 \$74B3	ROM 0	960-5015-01
Voice 1	(8M)	965-0349-65		U17	960-5016-00
Voice 2	(8M)	965-0350-65		U21	960-5016-00
Voice 3	(8M)	965-0351-65		U36	960-5016-00
Voice 4	(8M)	965-0352-65		U37	960-5016-00
Austin Powers™ (Notes 4, 5)					
Game ROM	(1M)	965-0353-74	A3.02 \$5DFF	U210	960-5009-00
Sound	(512K)	965-0354-74		U7	960-7001-02
Display	(4M)	965-0355-74	A3.00 \$6A34	ROM 0	960-5015-01
Voice 1	(8M)	965-0356-74		U17	960-5016-00
Voice 2	(8M)	965-0357-74		U21	960-5016-00
Voice 3	(8M)	965-0358-74		U36	960-5016-00
Voice 4	(8M)	965-0359-74		U37	960-5016-00
Monopoly® (Notes 4, 5)					
Game ROM	(1M)	965-0360-75	A3.03 \$5EFF	U210	960-5009-00
Sound	(512K)	965-0361-75		U7	960-7001-02
Display	(4M)	965-0362-75	A3.01 \$A381	ROM 0	960-5015-01
Voice 1	(8M)	965-0363-75		U17	960-5016-00
Voice 2	(8M)	965-0364-75		U21	960-5016-00
Voice 3	(8M)	965-0365-75		U36	960-5016-00
Voice 4	(8M)	965-0366-75		U37	960-5016-00
Playboy (Notes 4, 5, 7)					
Game ROM	(1M)	965-0367-76	A5.00 \$7DFF	U210	960-5009-00
Sound	(512K)	965-0368-76		U7	960-7001-02
Display	(4M)	965-0369-76	A5.00 \$A5FF	ROM 0	960-5015-01
Voice 1	(8M)	965-0370-76		U17	960-5016-00
Voice 2	(8M)	965-0371-76		U21	960-5016-00
Voice 3	(8M)	965-0372-76		U36	960-5016-00
Voice 4	(8M)	965-0373-76		U37	960-5016-00
RollerCoaster Tycoon™ (Notes 4, 5, 7)					
Sound	(512K)	965-0374-78		U7	960-7001-02
Game ROM	(1M)	965-0375-78	A7.01 \$40FF	U210	960-5009-00
Voice 1	(8M)	965-0377-78		U17	960-5016-00
Voice 2	(8M)	965-0378-78		U21	960-5016-00
Voice 3	(8M)	965-0379-78		U36	960-5016-00
Voice 4	(8M)	965-0380-78		U37	960-5016-00
Display	(4M)	965-0376-78	A7.00 \$8E23	ROM 0	960-5015-01

Current as of:



footnotes:

- 1 ROMs on CPU/Sound Bd.: 520-5136-00 (Stereo) & Display Cont. Bd.: 520-5055-01
- 2 ROMs on CPU/Sound Bd.: 520-5136-10 (Mono) & Display Cont. Bd.: 520-5055-01
- 3 ROMs on CPU/Sound Board: 520-5136-15* (Mono) (FCC 11-97) & Display Controller Board: 520-5055-02* (FCC 11-97)
- 4 ROMs on CPU/Sound Bd.: 520-5136-16* (Mono) (FCC 02-98) & Display Controller Board: 520-5055-03* (FCC 02-98)
- 5 This game uses 8MB VOICE ROMS at U17, U21, U36 & U37 (if 3 ROMs use U37 will be unused) requiring a Jumper at Loc. W6. Refer to CPU/Snd. Bd. Schematic (2 of 3).
- 6 Harley-Davidson® 2nd Edition: For Game ROM, Sound & Display info (version, check sums, part numbers) call Tech Support. Check our website (see back cover) for current versions or other info. Raw Part numbers are identical to the Harley-Davidson® original.
7. TOPS™ (Tournament Pinball System) READY!

Game Revisions can be updated after the Production Run. This Table is accurate as of the printing of this manual. If any changes occurred, the next game manual will include the updated information. The version stated is USA. If there is a question of as to the latest Code Revision & Check Sum call our Technical Support Department, 1-800-542-5377 or 1-708-345-7700 (Select Option 1). Visit our website www.SternPinball.com where code can be downloaded (an EPROM Burner is required).

APPENDIX B

Semi-Conductors / Integrated Circuits (I.C.) / Relays Cross-Reference Table

Table No	Type	Source Number	STERN™ PINBALL	N T E®	E C G®	Radio Shack®	R C A®
1	RECTIFICATION, BLOCKING, DAMPENING DIODES AND/OR LIGHT EMITTING DIODES (LEDs)						
	Diode	1N4001	112-5001-00	NTE552	ECG552	-----	SK9000
	Diode	1N4004	112-5003-00	NTE116	ECG116	276-1103	SK3312
	Diode	1N5401	112-0056-00	NTE5801	ECG5801	276-1143	SK9004
	Diode	1N5404	112-5004-00	NTE5804	ECG5804	276-1144	SK9007
	Diode	T6A10L	112-5006-01	NTE5812	ECG5812	-----	-----
	Diode	FR302	112-5009-00	NTE588	ECG588	-----	SK5014
	Diode, Signal	1N914	112-5014-00	-----	-----	-----	-----
2	LED	MT5000UR or TLRH180P (T1-3/4 GaAlAs)	165-5052-00 <i>(old SPI Part No: 165-5100-00)</i>	-----	-----	276-066B	-----
	ZENER DIODES						
	Diode	1N4742A 12v	112-0061-00	NTE142A	ECG142A	276-563	SK12V
	Diode	1N4760B 68v	112-0062-00B	NTE5092A	ECG5092A	-----	SK68V
	Diode	1N4764A 100v	112-0049-00A	NTE5096A	ECG5096A	-----	SK100V
	Diode	1N5228 3.9v	112-0053-00	NTE5007A	ECG5007A	-----	SK3A9
	Diode	1N5234B 6.2v	112-0047-00B	NTE5013A	ECG5013A	276-561	SK6A2
	Diode	1N5379 110v	112-0072-00	NTE5157	ECG5157	-----	SK110X
3	Diode	1N6267A 6.8v	112-5011-00	NTE4902	ECG4902	-----	-----
	Diode	1N4752A 33v	112-5010-00A	NTE147A	ECG147A	-----	SK33V
	Diode	1N4736 6.8v 1w	112-5007-00	NTE5071A	ECG5071A	-----	-----
	TRANSISTORS - TYPE FET, NPN, PNP AND/OR SCR						
	FET Trans.	STP20N10L	110-0106-00	NTE2987	ECG2987	-----	-----
	FET Trans.	STP19N06L	110-0088-00	NTE2985	ECG2985	-----	-----
	FET Trans.	VN02N	110-0089-00	-----	-----	-----	-----
	NPN Trans.	2N4401	110-0073-00	NTE85	ECG85	276-2009	SK3124A
4	NPN Trans.	2N6427	110-0070-00	NTE48	ECG48	-----	SK4906
	NPN Trans.	MJE340	110-0071-00	NTE157	ECG157	-----	SK3747
	NPN Trans.	MPSA42	110-0082-00	NTE287	ECG287	-----	SK3232
	NPN Trans.	2N3904	110-0069-00	NTE123AP	ECG123AP	276-2009	-----
	NPN Trans.	TIP122	110-0067-00	NTE261	ECG261	276-2068	SK3896
	NPN Trans.	MJE15030	110-0101-00	NTE375	ECG375	-----	SK9118
	PNP Trans.	2N5401	110-0078-00	NTE288	ECG288	-----	SK3434
	PNP Trans.	MJE15031	110-0103-00	NTE292	ECG292	-----	SK3441
5	PNP Trans.	MJE350	110-0072-00	NTE374	ECG374	-----	SK9042
	PNP Trans.	MPSA92	110-0100-00	NTE288	ECG278	-----	SK3434
	PNP Trans.	TIP42	110-0068-00	NTE332	ECG332	-----	SK9236
	PNP Trans.	TIP32C	110-0081-00	NTE292	ECG292	-----	SK3441
	PNP Trans.	TIP36C	110-0077-00	NTE393	ECG393	-----	SK3961
	SCR Trans.	2N5060	110-0074-00	NTE5400	ECG5400	276-1067	SK3950
	SCR Trans.	SCR2800B	110-0083-00	NTE5461-8	ECG5461-8	-----	-----
	BRIDGE RECTIFIERS (BR)			Comments:			
4	BR (Present)	DB3501 or CM3501	112-5000-00	For White Star I/O Bds., BR = 35 Amp @ 100v P.I.V.			
	RELAYS			Comments:			
5	Relay	FRL-264 D024/02CK	190-5002-00	For PPB, Power Supply, & White Star I/O Boards, Relay = 24v DC 10 Amp DPDT			
	Relay	FRL-264 D006/04CV	190-5001-00	For CPU Boards, Relay = 6v DC 5 Amp 4 Pole DT			



APPENDIX C

Game Mfg. Date, Manual Part N^o & CPU Jumper Table†

Game Name	Game Mfg. Date and Manual PN ^o	CPU Ver.	EPROM Position	Jumpers Installed († see Note)	Jumpers Removed († see Note)	Game Name	Game Mfg. Date and Manual PN ^o	CPU Ver.	EPROM Position	Jumpers Installed	Jumpers Removed
1. Laser War	MAY 87 780-5001-00	1	5C	J4 J6a J7a	J5 J6 J7b	29. Apollo 13 (A13)	NOV 95 780-5044-00	—	U210	n / a	n / a
2. Secret Service	MAR 88 780-5002-00	2	5B, 5C	J4	J5	30. Golden Eye	FEB 96 780-5042-00	—	U210	n / a	n / a
3. Torpedo Alley	AUG 88 780-5003-00	2	5B, 5C	J4	J5	31. Twister	APR 96 780-5041-00	—	U210	n / a	n / a
4. Time Machine	DEC 88 780-5004-00	2	5B, 5C	J4	J5	32. ID4: Independence Day	JUL 96 780-5045-00	—	U210	n / a	n / a
5. Playboy 35th Anniversary	MAY 89 780-5005-00	2	5B, 5C	J4	J5	33. Space Jam	OCT 96 780-5043-00	—	U210	n / a	n / a
6. ABC Monday Night Football	SEP 89 780-5007-00	2	5B, 5C	J4	J5	34. The Star Wars Trilogy - S.E.	FEB 97 780-5056-00	—	U210	n / a	n / a
7. Robocop	NOV 89 780-5006-00	2	5B, 5C	J4	J5	35. The Lost World: J.P.	JUN 97 780-5053-00	—	U210	n / a	n / a
8. Phantom of the Opera	JAN 90 780-5008-00	2	5B, 5C	J4	J5	36. The X-Files	AUG 97 780-5046-00	—	U210	n / a	n / a
9. Back to the Future	JUN 90 780-5009-00	3	5B, 5C	J4	J5	37. Starship Troopers	NOV 97 780-5059-00	—	U210	n / a	n / a
10. The Simpsons	SEP 90 780-5012-00	3	5B, 5C	J4	J5	38. Viper Night Drivin'	FEB 98 780-5035-00	—	U210	n / a	n / a
11. Checkpoint	FEB 91 780-5010-00	3	5B, 5C	J4	J5	39. Lost In Space	JUN 98 780-5060-00	—	U210	n / a	n / a
12. Teenage Mutant Ninja Turtles	MAY 91 780-5017-00	3	5B, 5C	J4	J5	40. Godzilla	SEP 98 780-5040-00	—	U210	n / a	n / a
13. Batman	JUL 91 780-5011-00	3	5B, 5C	J4	J5	41. South Park	JAN 99 780-5071-00	—	U17 U21 U36 U37	W6 CPU/Snd.	n / a
14. Star Trek 25th Anniversary	OCT 91 780-5014-00	3	5C	J5	J4	42a. Harley-Davidson®	AUG 99 780-5067-01	—	U17 U21 U36 U37	W6 CPU/Snd.	n / a
15. Hook	JAN 92 780-5019-00	3	5C	J5	J4	42b. Harley-Davidson® 2nd Ed.	JUN 02 780-5067-10	—	U17 U21 U36 U37	W6 CPU/Snd.	n / a
16. Lethal Weapon 3	JUN 92 780-5026-00	3	5C	J5	J4	43a. Striker Xtreme	MAR 00 780-5068-01	—	U17 U21 U36 U37	W6 CPU/Snd.	n/a
17. Star Wars	OCT 92 780-5024-00	3	5C	J5	J4	43b. NFL	OCT 00 780-5073-00	—	U17 U21 U36 U37	W6 CPU/Snd.	n/a
18. Rocky & Bullwinkle & Friends	FEB 93 780-5022-00	3	5C	J5	J4	44. Sharkey's Shootout	OCT 00 780-5072-01	—	U17 U21 U36	W6 CPU/Snd.	n/a
19. Jurassic Park	APR 93 780-5020-00	3	5C	J5	J4	45. High Roller Casino	JAN 01 780-5065-00	—	U17 U21 U36 U37	W6 CPU/Snd.	n/a
20. Last Action Hero	AUG 93 780-5027-00	3	5C	J5	J4	46. Austin Powers™	MAY 01 780-5074-00	—	U17 U21 U36 U37	W6 CPU/Snd.	n/a
21. Tales from the Crypt	NOV 93 780-5018-00	3	5C	J5	J4	47. Monopoly®	SEP 01 780-5075-00	—	U17 U21 U36 U37	W6 CPU/Snd.	n/a
22. The Who's Tommy	FEB 94 780-5028-00	3	5C	J5	J4	48. Playboy	FEB 02 780-5076-00	—	U17 U21 U36 U37	W6 CPU/Snd.	n/a
23. WWF Royal Rumble	MAY 94 780-5023-00	3	5C	J5	J4						
24. Guns-N'-Roses	JUL 94 780-5029-00	3	5C	J5	J4						
25. Maverick	SEP 94 780-5031-00	3	5C	J5	J4						
26. Mary Shelley's Frankenstein	DEC 94 780-5036-00	3	5C	J5	J4						
27. Baywatch	MAR 95 780-5033-00	3	5C	J5	J4						
28. Batman Forever	JUL 95 780-5038-00	3	5C	J5	J4						

† Additional Information for Installed / Removed Jumpers (List 1-28 only):

Board Combinations with **ROM** at Location **5C** (Game 1, Ver1) **Installed** J1b, J3, J4, J6a, **J7a** & J8 **Removed** J1a, J2, J5, **J6** & **J7b**

Board Combinations w/ **ROM** at Locations **5B, 5C** (Game 1, Ver2) **Installed** J1b, J3, J4, **J5a, J6a, J7b** & J8 **Removed** J1a, J2, J5, **J5b, J6b, & J7a**

Board Combinations w/ **ROM** at Locations **5B, 5C** (Games 2-12, Ver2/3) **Installed** J1b, J3, **J4, J5b, J6b, J7b** & J8 **Removed** J1a, J2, **J5, J5a, J6a** & J7a

Board Combinations with **ROM** at Locations **5C** (Games 14-28, Ver3) **Installed** J1b, J3, **J5, J5b, J6b, J7b** & J8 **Removed** J1a, J2, **J4, J5a, J6a** & J7a

* Version 1 has a 2K RAM which is a 24-pin IC in Position 5D; Versions 2 & 3 have a 8K RAM which is a 28-PIN IC in Position 5D.

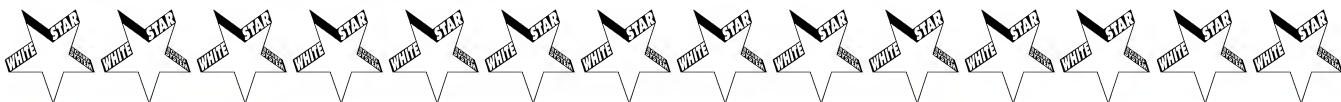
APPENDIX D

Board Type Table

Game Name	Flipper	Sound	Power Supply	Display X-Digit
Laser War	2-Flipper Board Not Required	<i>initial:</i> 520-5002-00 <i>replaced with:</i> 520-5002-02 <i>520-5002-01 was not used.</i>	520-5000-00	Master: 520-5004-00 plus: 520-5005-00 (Qty. 2): 7 Digit Alpha/Numeric 520-5006-00 (Qty. 2): 7 Digit Numeric 520-5007-00 (Qty. 1): 4 Digit Numeric
Secret Service	3-Flipper Board Not Required	520-5002-02	520-5000-00	520-5014-01 7 Digit Alpha/Numeric Combined
Torpedo Alley	3-Flipper Board Not Required	520-5002-02	520-5000-00	520-5014-01 7 Digit Alpha/Numeric Combined
Time Machine	2-Flipper Board Not Required	520-5002-02	520-5000-00	520-5014-01 7 Digit Alpha/Numeric Combined
Playboy 35th Anniversary	520-5033-00 2-Flipper (for 100 games)	520-5002-02	520-5000-00	520-5014-01 7 Digit Alpha/Numeric Combined
ABC Monday Night Football	520-5033-00 2-Flipper (for 100 games)	520-5002-02	520-5000-00	520-5030-00 16 Digit Alpha/Numeric Combined
Robocop	520-5033-00 2-Flipper	520-5002-02	520-5000-00	520-5030-00 16 Digit Alpha/Numeric Combined
Phantom of the Opera	520-5033-00 2-Flipper	520-5002-02	520-5000-00	520-5030-00 16 Digit Alpha/Numeric Combined
Back to the Future	520-5033-00 2-Flipper	520-5002-02	520-5000-00	520-5030-00 16 Digit Alpha/Numeric Combined
The Simpsons	520-5033-00 2-Flipper	520-5002-03	520-5000-00	520-5030-00 16 Digit Alpha/Numeric Combined

Game Name	Flipper	Sound	Power Supply	Dot Matrix Display	Display Controller	OPTO Transmitter	OPTO Receiver	OPTO Application
Checkpoint	520-5033-00 2-Flipper	520-5002-03	520-5047-00	520-5042-00 128 X 16				
Teenage Mutant Ninja Turtles	520-5033-00 2-Flipper	520-5002-03	520-5047-00	520-5042-00 128 X 16				
Batman	520-5033-00 2-Flipper	520-5050-01	520-5047-00	520-5042-00 128 X 16				
Star Trek 25th Anniversary	520-5033-00 2-Flipper	520-5050-01	520-5047-00	520-5042-00 128 X 16				
Hook	520-5033-00 2-Flipper	520-5050-01	520-5047-00	520-5042-00 128 X 16				
Lethal Weapon 3	520-5033-00 2-Flipper	520-5050-01	520-5047-01	520-5052-00 128 X 32	520-5055-00			
Star Wars	520-5033-00 2-Flipper	520-5050-02	520-5047-01	520-5052-00 128 X 32	520-5055-00			
Rocky & Bullwinkle & Friends	520-5033-00 2-Flipper	520-5050-02	520-5047-01	520-5052-00 128 X 32	520-5055-00			
Jurassic Park	520-5076-00 3-Flipper	520-5050-02	520-5047-02	520-5052-00 128 X 32	520-5055-00			
Last Action Hero	520-5070-00 2-Flipper	520-5050-03	520-5047-02	520-5052-00 128 X 32	520-5055-00			
Tales from the Crypt	520-5076-00 3-Flipper	520-5050-03	520-5047-02	520-5052-00 128 X 32	520-5055-01			
The Who's Tommy	520-5076-00 3-Flipper	520-5077-00	520-5047-02	520-5052-00 128 X 32	520-5055-01			
WWF Royal Rumble	520-5070 / 5080-00 4-Flipper (2X2)	520-5077-00	520-5047-02	520-5052-00 128 X 32	520-5055-01			
Guns N' Roses	520-5076-00 3-Flipper	520-5077-00	520-5047-02	520-5052-00 128 X 32	520-5055-01			
Maverick	520-5076-00 3-Flipper	520-5050-03	520-5047-03	520-5075-00 192 X 64	520-5092-01	520-5102-00 Single OPTO	520-5103-00 Single OPTO	Paddle Boat Wheel Enter
Mary Shelley's Frankenstein	520-5076-00 3-Flipper	520-5077-00	520-5047-03	520-5075-00 192 X 64	520-5092-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	5-Ball Trough over Up-Kicker
Baywatch	520-5070 / 5080-00 4-Flipper (2X2)	520-5126-02	520-5047-03	520-5075-00 192 X 64	520-5092-01			
Batman Forever	520-5076-00 3-Flipper	520-5126-02	520-5047-03	520-5075-00 192 X 64	520-5092-01			

Miscellaneous Boards (Lamp Boards & Relay Boards) not listed above can be found in each individual game manual.



GAMES HEREON USE THE WHITE STAR BOARD SYSTEM™ (with the addition of the I/O Power Driver Board):

Game Name	Flipper	I/O Power Driver	CPU/Sound Stereo	Disp. Power Supply	Dot Matrix Display	Display Controller	OPTO Transmitter	OPTO Receiver	OPTO Application
Apollo 13	520-5080-00 2-Flipper	520-5137-00	520-5136-00	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	5-Ball Trough over Up-Kicker
	Miscellaneous PC Boards:	Light Boards 520-5130-01, -04 & -05 Magnet Interface, 7-Segment Display & Light Bd. 520-5130-06 Magnet Driver Board 520-5130-02 Switch Membrane Board 520-5130-03				Relay Board 520-5010-00			
Golden Eye	520-5080-00 2-Flipper	520-5137-00	520-5136-00	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	5-Ball Trough over Up-Kicker
	Miscellaneous PC Boards:	Light Boards 520-5128-05 through -08 Mag. Processor X2 Driver Bd. 520-5143-00				Relay Board 520-5010-00			

Table continued on the next page.



APPENDIX D

Board Type Table

GAMES HEREON USE THE WHITE STAR BOARD SYSTEM™ (with the deletion of the Flipper Board):

Game Name	I/O Power Driver	CPU/Sound Mono	Disp. Power Supply	Dot Matrix Display	Display Controller	OPTO Transmitter	OPTO Receiver	OPTO Application	Misc OPTO & App.	
Twister	520-5137-01	520-5136-10	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	5-Ball Trough over Up-Kicker		
	Miscellaneous PC Boards:	Light Boards 520-5145-01 through -07		Mag. Drv. Bd. 520-5143-00	Relay Board 520-5010-00					
Independence Day (ID4)	520-5137-01	520-5136-10	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker		
	Miscellaneous PC Boards:	Light Boards 520-5149-01 through -10		Servo Mtr. Bd. 520-5152-00		520-5082-00 Long Hop OPTO	520-5083-00 Long Hop OPTO	Alien Head Enter		
Space Jam	520-5137-01	520-5136-10	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	5-Ball Trough over Up-Kicker		
	Miscellaneous PC Boards:	2X 7-Segment Display Board 520-5153-00								
The Star Wars Trilogy - Special Ed.	520-5137-01	520-5136-10	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker		
	Miscellaneous PC Boards:	Relay Board 520-5010-00								
The Lost World: J.P.	520-5137-01	520-5136-10	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker		520-5162-00 2-Pos. Motor Sensor on Snagger Motor
	Miscellaneous PC Boards:	DC Relay Bd. 520-5066-00	Shaker Mtr. Bd. 520-5065-00							
The X-Files	520-5137-01	520-5136-10	520-5138-00	520-5052-00 128 X 32	520-5055-01	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker	520-5155-00 3-Pos. Motor Sensor on File Cab. Motor	
	Miscellaneous PC Boards:					520-5082-00 Long Hop OPTO	520-5083-00 Long Hop OPTO	File Cabinet Enter		
Starship Troopers	520-5137-01	520-5136-15	520-5138-00	520-5052-00 128 X 32	520-5055-02	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker		
	Miscellaneous PC Boards:	4X 7-Segment Display Board 520-5166-00				520-5082-00 Long Hop OPTO	520-5083-01 Long Hop OPTO	L/R Orbit Lane Enter		
Viper Night Drivin'	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5124-00 Single OPTO	520-5125-00 Single OPTO	4-Ball Trough over Up-Kicker		
	Miscellaneous PC Boards:	Relay Board 520-5010-00			520-5082-00 Long Hop OPTO	520-5083-01 Long Hop OPTO	Jump Ramp			
Lost In Space	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker		
	Miscellaneous PC Boards:	Relay Board 520-5010-00								
Godzilla	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker		
	Miscellaneous PC Boards:	Shaker Mtr. Bd. 520-5065-00								
South Park	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	5-Ball Trough over Up-Kicker		
	Miscellaneous PC Boards:					520-5082-00 Long Hop OPTO	520-5083-01 Long Hop OPTO	Kenny Under Trough Enter		
Harley-Davidson®	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker		
	Miscellaneous PC Boards:	Relay Board 520-5010-00	Shaker Mtr. Bd. 520-5065-00	Diode Board 520-5146-00		520-5082-00 Long Hop OPTO	520-5083-01 Long Hop OPTO	Motorcycle Enter		
Striker Xtreme (NFL)	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	520-5155-00 3-Pos. Motor Sensor on Goalie Motor	
	Miscellaneous PC Boards:	DC Relay Bd. 520-5066-00	Relay Board 520-5010-00	Diode Board 520-5146-00	for UK ONLY> Solenoid Expander Bd. 520-5192-00	520-5082-00 Long Hop OPTO	520-5083-01 Long Hop OPTO	Goalie Under- Trough Enter		
Sharkey's Shootout	520-5137-64	520-5136-64	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	520-5194-00 4-Pos. Motor Sensor on ?-Ball Motor	
	Miscellaneous PC Boards:	Relay Board 520-5010-00	Sol. Exp. Bd. 520-5192-00							
High Roller Casino	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	520-5194-00 4-Pos. Motor Sensor on Roulette Wheel Motor	
						520-5082-00 Long Hop OPTO	520-5083-01 Long Hop OPTO	Ball Lock Under Roulette		
	Miscellaneous PC Boards:	Dot Display (5X7) in Slot Mach. 520-5197-00			for UK ONLY> Solenoid Expander Bd. 520-5192-00	520-5196-00 3-Pos. OPTO	520-5195-00 3-Pos. OPTO	Up/Dn Ramp in Slot Mach.		
Austin Powers™	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker	520-5212-00 Pulse-Stretcher OPTO on Spini-Me	
	Miscellaneous PC Boards:	Relay Bd. (X3) 520-5010-00			for UK ONLY> Solenoid Expander Bd. 520-5192-00					
Monopoly®	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker		
	Miscellaneous PC Boards:	DC Relay Bd. 520-5066-00	Dot Display (5X7) in Elec. Sign 520-5197-00		for UK ONLY> Solenoid Expander Bd. 520-5192-00	520-5218-00 4-Pos. OPTO	520-5210-00 4-Pos. OPTO	Bank Door		
Playboy	520-5137-01	520-5136-16	520-5138-00	520-5052-00 128 X 32	520-5055-03	520-5173-00 Dual OPTO	520-5174-00 Dual OPTO	4-Ball Trough over Up-Kicker		
	Miscellaneous PC Boards:	DC Relay Bd. 520-5066-00	Relay Bd. 520-5010-00			for UK ONLY> Solenoid Expander Bd. 520-5192-00				

† **Note:** To order Game Specific CPU/Sound Board please specify Game Name.

APPENDIX E

Generic Coil Cross-Reference Guide † ‡

STANDARD COILS						FLIPPER COILS			
GA-TURNS	Res. (Ω)	SPI PART N°	GA-TURNS	Res. (Ω)	SPI PART N°	GAUGE-TURNS	Res. (Ω)	COLOR	SPI PART N°
20-400	1.0 Ω	090-5021-00	24-940 †	5.5 Ω	090-5036-00T	21-900 †	not available	RED	090-5020-10T
22-500	1.7 Ω	090-5017-00			090-5036-00B	22-750/30-2600 ‡	2.6 / 92.0 Ω	N/A	090-5011-00
22-600	2.2 Ω	090-5023-00	25-1240	9.3 Ω	090-5034-00	22-900 †	3.4 Ω	YEL	090-5020-20T
23-700	3.1 Ω	090-5022-00	26-1200 †	10.3 Ω	090-5044-00T	22-1080 †	4.3 Ω	YEL/GRN	090-5032-00T
23-750	3.4 Ω	090-5019-00			090-5044-00B				090-5032-00B
23-800 †	3.6 Ω	090-5001-00T	27-1300	14.2 Ω	090-5003-00	23-620/30-2600 ‡	2.4 / 75.0 Ω	N/A	090-5006-00
		090-5001-00B	27-1400	14.7 Ω	090-5015-00	23-700/30-2600 ‡	3.0 / 83.5 Ω	N/A	090-5013-00
23-840	4.0 Ω	090-5005-00	27-1500	16.3 Ω	090-5004-00T	23-800/30-2600 ‡	2.8 / 90.5 Ω	N/A	090-5012-00
23-1200	7.1 Ω	090-5008-00			090-5004-00B	23-900	3.8 Ω	GRN	090-5020-30
23½-765	3.6 Ω	090-5037-03	28-1050	11.5 Ω	090-5046-00	23-1100	5.1 Ω	ORG	090-5030-00
24-900	5.0 Ω	090-5002-00	29-2000	33.6 Ω	090-5016-00	23-1500	4.4 Ω	BLU	090-5062-00T
						24-1570	9.5 Ω	N/A	090-5025-00
						25-1800	13.8 Ω	BLU/GRN	090-5041-00

NOTE: Ohm values may vary +/- .03 Ω *depending on meter calibration.*

† Coil Part N°s ending with a "T" signifies the Diode is on the top of the lug; ...ending with a "B" signifies the Diode is on the bottom of the lug.

‡ These coils are dual-wound. **Also Note:** All Coil Part N°s listed **Do Not Include** Coil Sleeves (must be ordered separately).

MAGNET COILS w/12" leads			TRIP COILS (Miniature)						LUGLESS COILS	
GA-TURNS	Res. (Ω)	SPI PART N°	GA-TURNS	Res. (Ω)	SPI PART N°	GA-TURNS	Res. (Ω)	SPI PART N°	GA-TURNS	Res. (Ω)
22-650	4.3 Ω	090-5042-01	29-1000	15.2 Ω	090-5059-00	33-1590	59 Ω	515-6916-00	SPI PART N°	
24-780	8 Ω	090-5061-00	31-1500	52.0 Ω	090-5054-00	32-1250	35 Ω	515-6916-01		
20½-480	2.9 Ω	090-5064-02	32-1800	50.2 Ω	090-5031-00	Note: 33-1590 WHT & 32-1250 YEL			23-800	3.6 Ω
									090-5053-00	

Flipper Coil Table ‡ ††

GAME NAME	N° of Flippers	LOWER FLIPPERS		UPPER FLIPPERS	
		SPI N° / GAUGE-TURNS / Color		SPI N° / GAUGE-TURNS / Color	
		LEFT	RIGHT	LEFT	RIGHT
Laser War ‡	2	090-5011-00 22-750 / 30-2600	SAME	Not Used	Not Used
Secret Service ‡	3	090-5006-00 23-620 / 30-2600	SAME	Not Used	090-5006-00 23-620 / 30-2600
Torpedo Alley ‡	3	090-5011-00 22-750 / 30-2600	090-5013-00 23-700 / 30-2600	Not Used	090-5012-00 23-800 / 30-2600
Time Machine ‡	2	090-5011-00 22-750 / 30-2600	SAME	Not Used	Not Used

‡ These coils are dual-wound.

Playboy 35th Anniversary ††	2	090-5020-02 22-900 -YEL-	SAME	Not Used	Not Used
ABC Monday Night Football ††	2	090-5020-02 22-900 -YEL-	SAME	Not Used	Not Used

†† A very small % of these games used a 090-5020-20 coil which used a proto-type Solid State Flipper System. The two types of coils both are 22-900 coils; the only difference being the addition of the 1N5404 Diode on the (-02) coils which was used in the Deger Design.

Robocop	2	090-5020-20 22-900 -YEL-	SAME	Not Used	Not Used
Phantom of the Opera	2	090-5020-20 22-900 -YEL-	SAME	Not Used	Not Used
Back to the Future	2	090-5020-20 22-900 -YEL-	SAME	Not Used	Not Used
The Simpsons	2	090-5020-20 22-900 -YEL-	SAME	Not Used	Not Used
Checkpoint	2	090-5020-20 22-900 -YEL-	SAME	Not Used	Not Used
Teenage Mutant Ninja Turtles	2	090-5020-30 23-900 -GRN-	SAME	Not Used	Not Used
Batman	2	090-5020-30 23-900 -GRN-	SAME	Not Used	Not Used
Star Trek 25th Anniversary	2	090-5020-30 23-900 -GRN-	SAME	Not Used	Not Used
Hook	2	090-5030-00 23-1100 -ORG-	090-5020-30 23-900 -GRN-	Not Used	Not Used
Lethal Weapon 3	2	090-5030-00 23-1100 -ORG-	SAME	Not Used	Not Used

Table continued on the next page.



APPENDIX E

Flipper Coil Table †

GAME NAME	Nº of Flippers	LOWER FLIPPERS		UPPER FLIPPERS	
		SPI Nº / GAUGE-TURNS / Color		SPI Nº / GAUGE-TURNS / Color	
		LEFT	RIGHT	LEFT	RIGHT
Star Wars	2	090-5032-00 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
Rocky & Bullwinkle & Friends	2	090-5020-30 23-900 -GRN-	SAME	Not Used	Not Used
Jurassic Park	3	090-5020-30 23-900 -GRN-	SAME	Not Used	090-5030-00 23-1100 -ORG-
Last Action Hero	2	090-5020-30 23-900 -GRN-	SAME	Not Used	Not Used
Tales from the Crypt	3	090-5032-00 22-1080 -YEL-GRN-	SAME	Not Used	090-5041-00 25-1800 -BLU-GRN-
The Who's Tommy	3	090-5020-30 23-900 -GRN-	SAME	090-5041-00 25-1800 -BLU-GRN-	Not Used
WWF Royal Rumble	4	090-5032-00 22-1080 -YEL-GRN-	SAME	090-5041-00 25-1800 -BLU-GRN-	SAME
Guns N' Roses	3	090-5032-00 22-1080 -YEL-GRN-	SAME	090-5030-00 23-1100 -ORG-	Not Used
Maverick	3	090-5032-00 22-1080 -YEL-GRN-	SAME	Not Used	090-5032-00 22-1080 -YEL-GRN-
Mary Shelley's Frankenstein	3	090-5030-00 23-1100 -ORG-	SAME	Not Used	090-5030-00 23-1100 -ORG-
Baywatch	4	090-5030-00 23-1100 -ORG-	090-5020-30 23-900 -GRN-	090-5025-00 24-1570 -N/A-	090-5030-00 23-1100 -ORG-
Batman Forever	3	090-5032-00 22-1080 -YEL-GRN-	090-5020-20 22-900 -YEL-	Not Used	090-5020-30 23-900 -GRN-
Apollo 13	2	090-5032-00 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
Golden Eye	2	090-5032-00 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
Twister	2	090-5020-20 22-900 -YEL-	090-5032-00 22-1080 -YEL-GRN-	Not Used	Not Used
ID4: Independence Day	3	090-5032-00 22-1080 -YEL-GRN-	SAME	Not Used	090-5020-30 23-900 -GRN-
Space Jam †	2	090-5032-00T 22-1080 -YEL-GRN-	090-5020-20T 22-900 -YEL-	Not Used	Not Used
The Star Wars Trilogy - Special Edition †	2	090-5032-00T 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
The Lost World: Jurassic Park †	2	090-5032-00T 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
The X-Files †	2	090-5032-00T 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
Starship Troopers †	3	090-5030-00T 23-1100 -ORG-	SAME	Not Used	090-5032-00T 22-1080 -YEL-GRN-
Viper Night Drivin' †	2	090-5030-00T 23-1100 -ORG-	SAME	Not Used	Not Used
Lost In Space †	2	090-5030-00T 23-1100 -ORG-	090-5032-00T 22-1080 -YEL-GRN-	Not Used	Not Used
Godzilla †	2	090-5032-00T 22-1080 -YEL-GRN-	SAME	Not Used	Not Used
South Park †	2	090-5030-00T 23-1100 -ORG-	SAME	Not Used	Not Used
Harley-Davidson® †	2	090-5032-00T 22-1080 -YEL-GRN-	090-5030-00T 23-1100 -ORG-	Not Used	Not Used
Striker Xtreme (NFL) †	3	090-5032-00T 22-1080 -YEL-GRN-	090-5030-00T 23-1100 -ORG-	090-5030-00T 23-1100 -ORG-	Not Used
Sharkey's Shootout †	3	090-5030-00T 23-1100 -ORG-	090-5030-00T 23-1100 -ORG-	090-5030-00T 23-1100 -ORG-	Not Used
High Roller Casino †	2	090-5020-20T 22-900 -YEL-	090-5032-00T 23-1080 -YEL-GRN-	Not Used	Not Used
Austin Powers™ †	2	090-5020-30 23-900 -GRN-	090-5030-00T 23-1100 -ORG-	Not Used	Not Used
Monopoly® †	3	090-5032-00T 22-1080 -YEL-GRN-	090-5032-00T 22-1080 -YEL-GRN-	Not Used	090-5062-00T 23-1500 -BLU-
Playboy †	2	090-5030-00T 23-1100 -ORG-	090-5030-00T 23-1100 -ORG-	Not Used	Not Used

† Coil Part N°s ending with a "T" signifies the Diode is on the top of the lug (on the coil-winding side);
Coil Part N°s ending with a "B" signifies the Diode is on the bottom of the lugs.

APPENDIX F

Motor Specification Table

The following table only list games that used motors. Part Numbers starting with "515-" will include the Wiring Harness & Connector.

Game Name	Function	Specifications	Part №
ABC Monday Night Football	Goal Post Up/Down Movement	Motor 24v A.C. 60 RPM CW	515-5222-00
Phantom of the Opera	Organ Up/Down Movement	Bowman Motor 24v 60Hz 3W 11 RPM CCW	515-5256-00
Checkpoint	Mag Wheel (in Backbox)	Motor D.C. (KEN)	041-5005-00
	Shaker	Johnson Motor (Vibrator)	041-5002-00
Teenage Mutant Ninja Turtles	Spinning Pizza Ball Deflector	Gear Motor 24v A.C. 325 RPM CW	515-5397-00
Batman	Bar Target Up/Down Movement	Bowman Motor 24v 60Hz 3W 11 RPM CCW	515-5256-00
Star Trek 25th Anniversary	Swinging Target	Bowman Motor 24v 22½ RPM	515-5534-00
	Transporter F/X	Gear Motor 24v A.C. 3½ RPM	500-5421-00
	Cooling Fan (for Transporter F/X)	4½" Motor 12v	041-5014-00
Lethal Weapon 3	Spinning Light	Motor 2½ v A.C. 4000 RPM CCW	041-5017-00
Star Wars	Bar Target Up/Down Movement	Bowman Motor 24v 60hz 3W 11 RPM CCW	515-5256-00
	R2D2 Robot Left/Right Movement	Bowman Motor 24v A.C. 22½ RPM CW	515-5571-00
	Death Star Rotation	Bowman "G" Motor 24v A.C. 60Hz 6 RPM CW	515-5570-00
Rocky & Bullwinkle & Friends	Nell Log "Cutting Blade" Forward/Back Movement	Autotrol Model E Motor 24v 60hz 4W 3 RPM CCW	041-5023-00
Jurassic Park	T-Rex Left/Right Movement	Multi Motor 5v D.C.	041-5025-00
	T-Rex Up/Down Movement	Bowman Motor 24v 11 RPM CW	041-5026-00
	Shaker	Johnson Motor (Vibrator)	041-5002-00
Last Action Hero	Crane Left/Right Movement	Multi Products Motor 12v D.C. #3312 OSC	041-5027-00
	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW	041-5029-00
Tales from the Crypt	Tombstone Up/Down Movement	Bowman Motor 24v A.C. 6 RPM CCW	515-5900-00
	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW	041-5029-00
The Who's Tommy	Mirror Up/Down Movement	Bowman Motor 24v A.C. 6 RPM CCW	515-5900-00
	Flipper Blinders	Servo Motor (94102)	041-5032-00
	Spinning Airplane Propellers	Motor D.C.	041-5033-00
WWF Royal Rumble	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW	041-5029-00
Maverick, The Movie	Turning Paddle Wheel	Motor 24v A.C. 10 RPM	041-5036-00
Mary Shelley's Frankenstein	Creature Head Left/Right Movement	Servo Motor (94102)	041-5032-00
Batman Forever	Cannon Left/Right Movement	Bowman Motor 24v A.C. 60Hz 3W 6 RPM CCW	515-6383-00
Apollo 13	Rocket Up/Down Movement	Bowman Motor 24v A.C. 60Hz 3W 6 RPM CCW	515-6383-00
	Moon Unit Rotational Orbit	Multi Products Motor 24v A.C. 50/60Hz 3W 6 RPM CCW	515-6487-00
	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW	041-5029-00
Golden Eye	Satellite Left/Right Movement	Bowman Motor 24v A.C. 60Hz 3W 6 RPM CW	515-6528-00

Table continued on the next page.



APPENDIX F

Motor Specification Table

The following table only list games that used motors. Part Numbers starting with "515-" will include the Wiring Harness & Connector.

Game Name	Function	Specifications	Part №
Twister	Spinning Disc with Magnet	Multi Products Motor 24v A.C. (041-5026-00) 50/60Hz 3W 325 RPM CCW	515-6347-00
	Backbox Fan (Tornado Wind)	Multi Products Motor 24v A.C. (041-5052-00) 50/60Hz 3W 3600 RPM CW	515-6531-00
ID4: Independence Day	Alien Head Open/Close Movement	Servo Motor (94322)	041-5045-00
The Star Wars Trilogy - S.E.	X-Wing Left/Right Movement	Bowman Motor 24v A.C. (041-5058-00) 60Hz 3W 10 RPM CCW	515-6383-01
The Lost World: J.P.	Snagger & Center Link Lift Up/Down Movement	Multi Products Motor 20v D.C. (041-5059-03) 9 RPM Non-Directional	515-6715-03
	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW	041-5029-00
The X-Files	X-File Cabinet Lift Up/Down Movement	Multi Products Motor 20v D.C. 9 RPM CCW	041-5057-00
Starship Troopers	Warrior Bug Forward/Reverse Movement	Haydon Switch & Instrument, Inc. Stepper Motor 12v D.C. 4.6W (041-5062-00), Series 36000: 1.4"ø (Non-Captive Shaft not incl.) HSI #36864-12 (Unipolar) Travel per Step: .004 Step Angle: 15°	515-6794-00 Requires 7" Shaft: 530-5503-00
Lost In Space	Spinning Disc with Magnet	Multi Products Motor 24v A.C. (041-5046-00) 50/60Hz 3W 325 RPM CCW	515-6347-00
Godzilla	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW ‡	041-5029-01
Harley-Davidson®	Shaker	Johnson Motor (Vibrator) 10.5v D.C. 10 AMP 2950 RPM CW ‡	041-5029-01
	Motorcycle Lift Up/Down Movement	Autotrol 24v A.C. (041-5072-01) 20 RPM CCW	515-7025-00
Striker Xtreme (NFL)	Goalie (Linebacker) Left to Right Movement	Multi #3590 12v D.C. (041-5075-00) 60 RPM	515-7071-00
Sharkey's Shootout	Mystery Ball Rotating Movement	Hanksraft Motor Model-E 24v A.C. (041-5076-00) 50/60Hz 3W 20 RPM CW	515-7095-00
High Roller Casino	Roulette Wheel Rotating Movement	Multi Products Motor 20V D.C. (041-5078-00) 17 RPM CCW	515-7153-00
	Up/Dn. Ramp in Slot Mach. Lift Up/Down Movement	Haydon Switch & Instrument, Inc. Stepper Motor 12v D.C. 4.6W (041-5062-00), Series 36000: 1.4"ø (Non-Captive Shaft not incl.) HSI #36864-12 (Unipolar) Travel per Step: .004 Step Angle: 15°	515-6794-00 Requires Shaft 4 1/4": 530-5503-01
Austin Powers™	Time Machine Rotating Movement	Multi Products Motor 24v A.C. (041-5079-00) 50/60Hz 20RPM CCW	515-7141-00
	Laser Beam Left to Right Directional	Autotrol Motor 24V A.C. (041-5081-00) 50/60Hz 4W 10RPM Bi-Directional	515-7171-00
	Dr. Evil Target Lift Up/Down Movement	Hanksraft Motor Model-E 24v A.C. (041-5030-00) 50/60Hz 6RPM CCW	515-5900-00
Monopoly®	Mini-Flipper (Waterworks) Rotating Movement	Multi Prod. Motor & Gear Box #7000 EX00159A 20v D.C. 50/60Hz 85RPM CC/CW	041-5083-00
Playboy	Triangular Billboard Rotating Movement	Autotrol Motor (BD511 150-1387) 24v A.C. 50/60Hz 12RPM Bi-Directional	041-5086-02
	Centerfold Mechanism Open/Close Movement	Multi Products (3680) Motor 12v DC 10/12 RPM CC/CW	041-5075-04
	Tease Drop Screen Lift Up/Down Movement	Haydon Switch & Instrument, Inc. Stepper Motor 12v D.C. 4.6W (041-5062-00), Series 36000: 1.4"ø (Non-Captive Shaft not incl.) HSI #36864-12 (Unipolar) Travel per Step: .004 Step Angle: 15°	515-6794-00 Requires 7" Shaft: 530-5503-00

No motors were used on the following games: Laser War, Secret Service, Torpedo Alley, Time Machine, Playboy 35th Anniversary, Robocop, Back to the Future, The Simpsons, Hook, Guns N' Roses, Baywatch, Space Jam, Viper Night Drivin', South Park.

‡ **Please Note:** "-01" Shaker Motor is **Not Compatible** with old Shaker Motor 041-5029-00 (Shaker Motor Assy. 515-5893-00). THIS NEW MOTOR CAN ONLY BE USED IN NEW SHAKER MOTOR ASSY. 515-5893-01.

APPENDIX G

Part Number Prefix Classification Codes

I. Electrical Source, Energy & Signal Converters

- 010- Transformers
- 031- Speakers
- 090- Solenoids (Coils)

II. Conductors, Connectors & Insulators

- 034- Line Cords
- 036- Cable and Harness Assemblies
- 041- Motors
- 045- Connectors (All Types)
- 077- Lamp Sockets

III. Circuits & Circuit Elements

- 100- ICs
- 110- Transistors
- 112- Diodes
- 121- Resistors
- 123- Resistors (Variable & Adjustable)
- 124- Regulators & Bridge Rectifiers
- 125- CAPS
- 140- Crystals
- 165- Light Bulbs
- 180- Switches
- 190- Relays

IV. Bolts, Screws, Nuts & Washers

- 231- Bolts
- 232- Screws (Pan Head)
- 234- Screws (HWH)
- 237- Screws (Misc.)
- 240- Nuts (Misc.)
- 242- Washers (Flat, Round)
- 244- Washers (Split Lock)
- 246- Washers (Lockers, External Tooth)

V. Mechanical Components

- 249- Rivets
- 251- Pins (Dowel)
- 254- Stand-Offs, Spacers and Shims
- 260- Steel Ball
- 265- Springs (Extension)
- 266- Springs (Compression)
- 269- Springs (Washers - Belleville, Wave)
- 280- Grommets and Bushing

VI. Handles, Locks, Catches & Latches, Keys & Hinges

- 355- Handles, Locks, Catches & Latches and Keys
- 390- Hinges

VII. Fabricated Parts (In-House Assemblies)

- 500- End Product (Systems and Models)
- 515- Sub-Assemblies
- 520- Printed Circuit Boards (PCBs)
- 522- Display Glass
- 525- Wood Parts
- 530- Screw Machined Parts
- 535- Fabricated Parts
- 545- Molded (Extruded) Plastic/Rubber Parts
- 550- Molded (Inserts)

VIII. Bulk Materials

- 600- Braided Ground Wire
- 601- Stranded Wire
- 602- Ribbon Cable
- 605- Sleeving (Shrink Tubing)
- 626- Foam Rubber

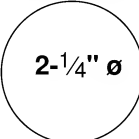
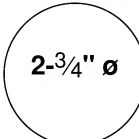
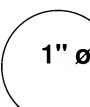
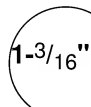
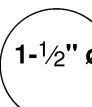
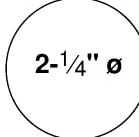
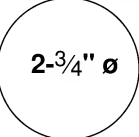
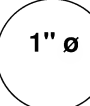
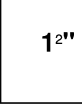
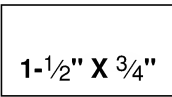
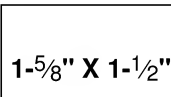
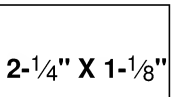
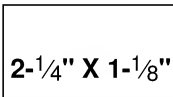
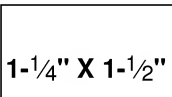
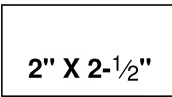
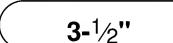
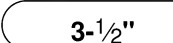
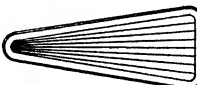
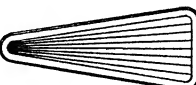
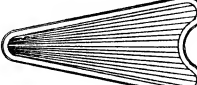
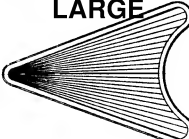
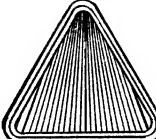
IX. Miscellaneous

- 705- Packing & Shipping Items
- 820- Decals and Labels (Sets & Misc.)
- 830- Butyrate (Plastic Pieces)
- 900- Game Posters
- 960- EPROM (Raw Part)
- 965- EPROM (Programmed Part)



APPENDIX H

Playfield Inserts (Plastic Light Covers)

Patterns: STARBURST  STIPPLE 	STARBURST CIRCULAR  550-5000-XX	STARBURST CIRCULAR  550-5001-XX	STARBURST CIRCULAR  550-5002-XX	STARBURST CIRCULAR  550-5003-XX	STARBURST CIRCULAR  550-5004-XX
STARBURST CIRCULAR  550-5005-XX	STARBURST CIRCULAR  550-5006-XX	PLAIN CIRCULAR  550-5007-XX	PLAIN CIRCULAR  550-5008-XX	PLAIN CIRCULAR  550-5009-XX	PLAIN CIRCULAR  550-5010-XX
PLAIN CIRCULAR  550-5011-XX	PLAIN CIRCULAR  550-5012-XX	STIPPLE CIRCULAR  550-5048-XX	STIPPLE 1" SQUARE  550-5019-XX	ROLLOVER BUTTON BASE  550-5026-XX	WHITE STAR (only in white)  545-5015-00
STIPPLE RECTANGULAR  550-5018-XX	STIPPLE RECTANGULAR  550-5051-XX	STARBURST RECTANGULAR  550-5044-XX	PLAIN RECTANGULAR  550-5049-XX	PLAIN RECTANGULAR  550-5050-XX	PLAIN RECTANGULAR  550-5063-XX
STARBURST MINI SHIELD  550-5024-XX	STARBURST LARGE SHIELD  550-5025-XX	MINI HOT DOG  550-5020-XX	BEVEL HOT DOG  550-5021-XX	PLAIN HOT DOG  550-5022-XX	BANANA  550-5023-XX
STARBURST ARROW-SMALL  550-5013-XX	STARBURST ARROW-LARGE  550-5070-XX	STARBURST ARROW-HEAD SMALL  550-5014-XX	STARBURST ARROW-HEAD LARGE  550-5015-XX	STARBURST BULLET  550-5016-XX	STARBURST TRIANGLE  550-5017-XX

Note: The shapes and sizes shown above are not to scale. Some shapes may no longer be available in every color.

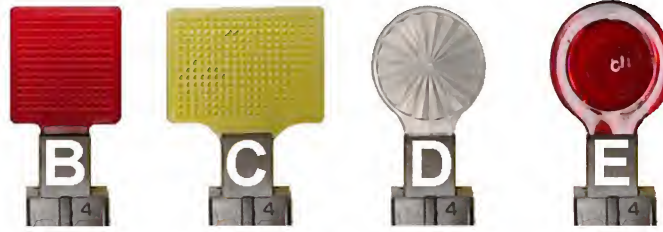
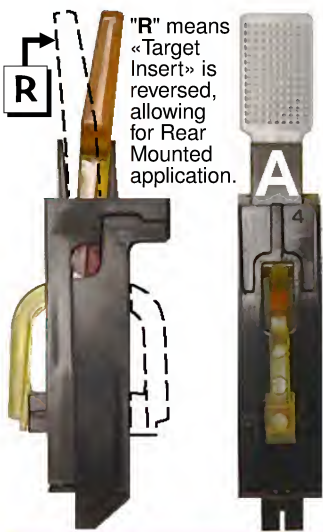
Instructions:

Parts which may come in various colors (i.e. targets, some posts, playfield inserts, etc.) end in a 2-digit N° which correspond to the color of that part. The "-XX" in Part N°s which may come in various colors should be replaced with the desired 2-Digit N°. corresponding to the color desired. *Not all colors may be available.*

PLASTIC PART COLOR CHART									
N°	Color	N°	Color	N°	Color	N°	Color	N°	Color
-00	Black or Solid Clear	-03	Amber	-06	Yellow	-09	Purple	-12	Fluor. Blue
-01	Clear	-04	Green	-07	Orange	-10	Fluor. Orange	-13	Teal Green
-02	Red	-05	Blue	-08	White	-11	Fluor. Green	-14	Gray
								-15	Luminescent
								-16	Gold
								-17	Trans. Brown

APPENDIX I

Stand-Up Targets

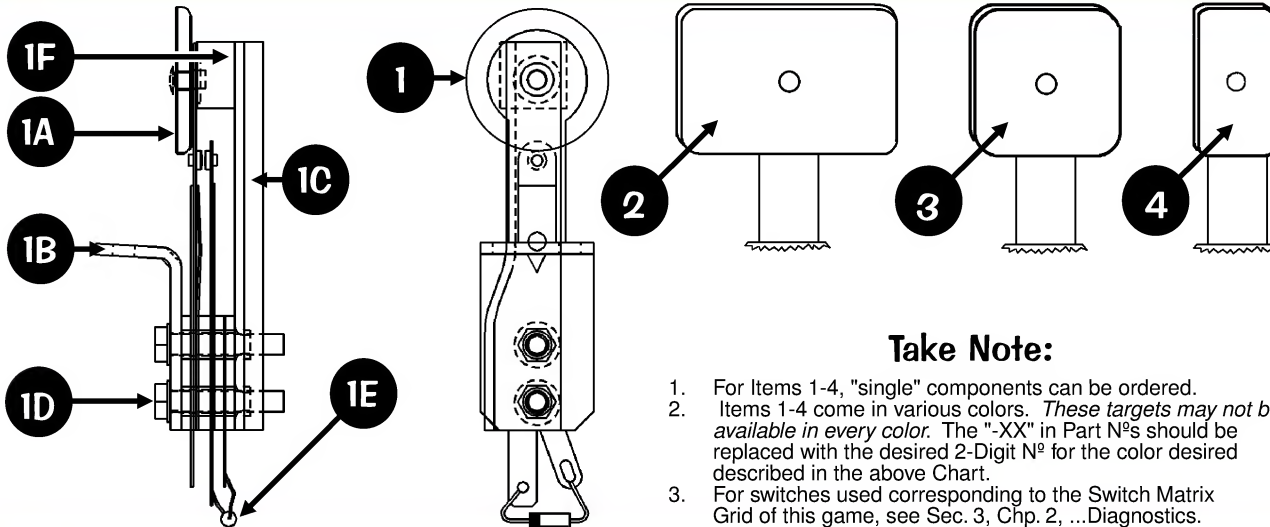


Take Note:

- For Items A-E, for the Target Assembly use the "500-" SPI N°; For the Target Assy. with Rear Mount add "R" to "500-" SPI N°; For just the «Target Insert» use the "545-" SPI N°.
- Items A-E come in various colors. *These targets may not be available in every color.* The "-XX" in should be replaced with the desired 2-Digit N° for the color desired described in the Chart ¶1.
As of date of print, the following colors were used for Items A-E:
-01 Clear (A, D); -02 Red (A, B, C, D, E); -03 Amber (D, E); -04 Green (A, B); -05 Blue (C); -06 Yellow (A, C); -09 Purple (B, D); -11 Fluorescent Green (A, B, D).
- See Section 3, Chapter 2, Go To Diagnostics Menu, for switches used corresponding to the Switch Matrix Grid of this game.

PLASTIC PART COLOR CHART	
N°	Color
-00	Black
-01	Clear
-02	Red
-03	Amber
-04	Green
-05	Blue
-06	Yellow
-07	Orange
-08	White
-09	Purple
-10	Fluor. Orange
-11	Fluor. Green
-12	Fluor. Blue
-13	Teal Green
-14	Gray
-15	Luminescent
-16	Gold

N°	STAND-UP TARGET NAME	SPI PART N°	N°	STAND-UP TARGET NAME	SPI PART N°
A	Modular Stand-Up Target Narrow Assy.	500-6138-XX	D	Modular Stand-Up Target Round Assy.	500-6075-XX
	Stand-Up Target Narrow (Insert)	545-6138-XX		Stand-Up Target Round (Insert)	545-6075-XX
B	Modular Stand-Up Target Square Assy.	500-6139-XX	E	Mod. Stand-Up Target 1" Spherical Assy.	500-6189-XX
	Stand-Up Target Square (Insert)	545-6139-XX		Stand-Up Target 1" Spherical (Insert)	545-6189-XX
C	Modular Stand-Up Target Rectangle Assy.	500-6228-XX	Note: To receive the Target Assembly with the «Target Insert» «Reversed» simply add a "R" at the end of the Part N°. See Side View picture above to compare (dashed line shows target reversed).		
	Stand-Up Target Rectangle (Insert)	545-6228-XX			



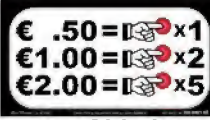
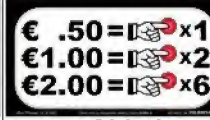
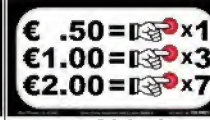
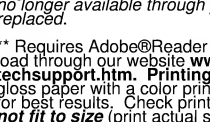
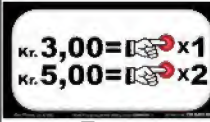
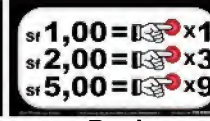
Take Note:

- For Items 1-4, "single" components can be ordered.
- Items 1-4 come in various colors. *These targets may not be available in every color.* The "-XX" in Part N°s should be replaced with the desired 2-Digit N° for the color desired described in the above Chart.
- For switches used corresponding to the Switch Matrix Grid of this game, see Sec. 3, Chp. 2, ...Diagnostics.

N°	STAND-UP (FLAT) TARGET NAME	SPI PART N°	N°	STAND-UP (FLAT) TARGET NAME	SPI PART N°
1	1" Round Stand-Up Target Assy.	500-5835-XX	Note: Item 2A, is a riveted Sub-Assy. which includes the following items for reference: A1 — Stack Switch Radius End (180-5133-00), A2 — Washer 5/16" (242-5017-00), A3 — Rivet 1/8" x 3/16" (249-5001-00) and A4 — Rectangular Target (545-5145-XX).		
ORDERING ABOVE (ITEM 1) ASSY. PART N° WILL INCLUDE: 1A‡ Switch & Target Assy. 1" Round 515-5966-XX 1B Mounting Bracket 535-6896-00 1C Switch Back Plate 535-6452-00 1D 6-32 X 3/4 HWH Swage (Qty. 2) 237-5976-05 1E Switch Diode, 1N4001 112-5001-00 1F Foam Pad 626-5029-00			3	1" Sq. Stand-Up Target Assy.	500-5232-XX
ORDERING ABOVE (ITEM 2) ASSY. PART N° WILL INCLUDE: 2A‡ Sw. & Target Assy. 1" X 1 1/2" Rect. 515-6027-XX Items 2B-F are identical to 1B-F Same as 1B-F			Note: Item 3A, is a riveted Sub-Assy. which includes the following items for reference: A1 — Stack Switch Radius End (180-5133-00), A2 — Washer 5/16" (242-5017-00), A3 — Rivet 1/8" x 3/16" (249-5001-00) and A4 — 1" Square Target (545-5470-XX).		
ORDERING ABOVE (ITEM 3) ASSY. PART N° WILL INCLUDE: 3A‡ Sw. & Target Assy. 1" Square 515-5162-XX Items 3B-F are identical to 1B-F Same as 1B-F			4	Narrow Stand-Up Target Assy.	500-5857-XX
ORDERING ABOVE (ITEM 4) ASSY. PART N° WILL INCLUDE: 4A‡ Sw. & Target Assy. Narrow 515-5967-XX Items 4B-F are identical to 1B-F Same as 1B-F			Note: Item 4A, is a riveted Sub-Assy. which includes the following items for reference: A1 — Stack Switch Square End (180-5132-00), A2 — Washer 5/16" (242-5017-00), A3 — Rivet 1/8" x 3/16" (249-5001-00) and A4 — Narrow Target (545-5210-XX).		

Item 2 Table Note continued in the next column.



Pricing Default: (note): See Section 3, Chapter 4, Go To Adjustments Menu, Adj. 6, Game Pricing, USA & International Standard Pricing Select Table, to view Custom or Standard Pricing Schemes these Coin Cards correspond to.	USA 8 or Canada (used prior 03/2002)	USA 2-7 or Canada (used prior 03/2002)	USA or International (used prior Mar. 02)	USA 1* (optional) (used prior Mar. 02)	USA 5 (used prior Mar. 02)
Description: SPI Part N^o:	Front 755-5087-01	Back 755-5087-01	for Custom Pricing 755-5087-02	1-Sided 755-5087-03	1-Sided 755-5087-05
USA 8 or Canada (supercedes 755-5087-01)	USA 5 or Canada (supercedes 755-5087-05)	USA 1* (optional) (supercedes 755-5087-03)	Custom Pricing† (supercedes 755-5087-02)	USA 2-7 or Canada (supercedes 755-5087-01)	Custom Pricing† (supercedes 755-5087-02)
					
Front 755-5400-00	Back 755-5400-00	Front 755-5400-01	Back 755-5400-01	Front 755-5400-02	Back 755-5400-02
EURO 1	EURO 2	EURO 3	EURO 4	EURO 5	EURO 6
					
1-Sided 755-5401-01	1-Sided 755-5401-02	1-Sided 755-5401-03	1-Sided 755-5401-04	1-Sided 755-5401-05	1-Sided 755-5401-06
EURO 7	EURO 8	EURO 9	EURO 10	EURO 11	EURO 12
					
1-Sided 755-5401-07	1-Sided 755-5401-08	1-Sided 755-5401-09	1-Sided 755-5401-10	1-Sided 755-5401-11	1-Sided 755-5401-12
Note: You can download any Coin Card (in PDF Format**) from our website www.sternpinball.com/coinagecards.htm . Only the Coin Cards shown on this page are available. Older styles (foreign or domestic), if no longer available through your distributor, cannot be replaced.					
** Requires Adobe® Reader 5.0 available for free download through our website www.sternpinball.com/techsupport.htm. Printing Suggestions: Print on high-gloss paper with a color printer (the highest dpi possible) for best results. Check print preview to ensure page is not fit to size (print actual size). Finished Cards should be 5 1/2" x 2 1/8". Trim off borders. For double-sided cards, print both separately, as aligning may be difficult.					
NORWAY 1		NORWAY 2		SWITZERLAND 1	
					
Front 755-5403-00	Back 755-5403-00	Front 755-5404-00	Back 755-5404-00	Front 755-5405-00	Back 755-5405-00
AUSTRALIA 1	AUSTRALIA 2	UK 1	UK 3	UK 5	UK Custom
					
Front 755-5406-00	Back 755-5406-00	Front 755-5407-00	Back 755-5407-00	Front 755-5407-01	Back 755-5407-01

† International can use the back side of this card for Custom Pricing.

* Optional Card not included with this game, but available.

Parts Order Checklist Notes

[illegible]

GLOSSARY OF TERMS

A Followed after a number means "Amp." or Ampage in an expression relating to an electrical object. (e.g. **8A**).

AC (Acronym) **A**lternating **C**urrent.

Adj. (Abbreviation) Adjustment(s).

Assy. (Abbreviation) Assembly.

Au. (Abbreviation) Audit(s).

Bd. (Abbreviation) Board.

BOT (Abbreviation) Bottom.

Brkt. (Abbreviation) Bracket.

Bridge Rectifier A configuration of a diode that allows current to flow in one direction producing both positive and negative pulsating DC Voltages.

Color Coding See Appendix H or I, Plastic Part Color Chart or Section 4, Chapter 1, Playfield - Plastic Posts & Spacers.

Combination (Combo) [Shot] Any variable pinball shot(s) made successively.

Conn. (Abbreviation) Connector.

CMOS Short for COSMOS (Complementary Symmetry M.O.S.); Complementary Metal-Oxide Semi-Conductor.

CN (Abbreviation) Connector (e.g. **CN5-P3**).

CT (Abbreviation) Center.

DC (Abbreviation) Direct Current.

DT (Abbreviation) Drop Target(s).

DOTS (Acronym) **D**iode **O**n **T**erminal **S**trip.

EB (Abbreviation) Extra Ball.

Eject Playfield surface device to kick ball back into play; Saucer.

EPROM (Acronym) **E**rasable **P**rogrammable **R**ead **O**nly **M**emory. Can be erased using UV Light and re-programmed.

e.g. (Abbreviation) Latin- Exempli gratia. For Example.

EOS (Acronym) **E**nd-**O**f-**S**troke (i.e. Switch for flipper).

F (Abbreviation) Fuse (i.e. **F23**).

GA-Turn Gauge & Turn describing the windings on a coil (e.g. 23-800, 23 is the gauge of wire and 800 is the amount of windings).

G.I. (Abbreviation) General Illumination (Lamps).

HWH (Abbreviation) Hex Washer Head.

IC (Acronym) **I**ntegrated **C**ircuit (As in after 24-Pin IC).

ID or I.D. (Acronym) **I**nside **D**imension.

i.e. (Abbreviation) Latin- Id est. That is.

IO or I/O (Abbreviation) Input / Output (e.g. I/O Power Driver Bd.)

LT, Lt. or L. (Abbreviation) Left.

Laser Kick A coil/plunger used above the playfield to kick pinball back into play.

LED (Acronym) **L**ight **E**mitting **D**iode.

Loop [Shot] Continuously up a ramp and back to the flipper.

Lwr. (Abbreviation) Lower.

Orbit [Shot] From the left or right flipper around the back rail of the playfield back to the flipper.

MB (Abbreviation) Magnet Board.

M-BALL or MBALL (Abbreviation) Multiball™ More than 1 ball in game play.

MID (Abbreviation) Middle

Non-Reflexive See Reflexive.

No. or N° or # (Abbreviation) Number

NPF (Acronym) **N**o **P**roblem **F**ound.

N.C. or NC (Abbreviation) Normally Closed.

N.O. or NO (Abbreviation) Normally Open.

NS (Abbreviation) Not Stuffed. (Use in Part Listings, Sec. 5)

OD or O.D. (Abbreviation) Outside Dimension.

P (Abbreviation) Pin (e.g. **CN5-P3**).

PCB (Acronym) **P**rinted **C**ircuit **B**oard

P/F (Abbreviation) Playfield.

PIA LED (Acronym) **P**eripheral **I**nterface **A**dapter **L**ight **E**mitting **D**iode.. This is a diagnostic LED on the CPU; it should not be lit during normal operation of a pinball game.

Plumb Bob Tilt Weight on Tilt Assembly.

PPH (Abbreviation) Phillips Pan Head.

Pop(s) Another term for Turbo Bumper(s).

PPB (Acronym) Playfield Power Board ("Popcorn-Popping Bd.").

PREV (Abbreviation) Previous.

PSB (Abbreviation) Power Supply Board

RAM (Acronym) **R**andom **A**ccess **M**emory. **RAM** can store input instructions and supply output information.

Reflexive/Non-Reflexive Reflexive—Solenoid Drive Transistor is enabled directly by a switch closure on the (Relating to CPU Boards) solenoid assembly (Ver. 1/2).

Non-Reflexive—Solenoid Drive Transistor is enabled by the CPU after reading a switch closure in the Switch Matrix (Ver. 3). Also note: All CPU Boards are backwards compatible (e.g. Jurassic Park/Ver. 3 to Time Machine/ Ver. 2). Swapping a Ver. 2 Board to a Ver. 3 is not possible due to the special solenoids section (i.e. Slingshots, Turbo Bumpers, etc.) changing from **REFLEXIVE** to **NON-REFLEXIVE** on Ver. 3 Boards.

Relay An automatic switch operated by current in a coil.

ROM (Acronym) **R**ead **O**nly **M**emory. **ROM** cannot store input instructions but can supply output information. **ROM** can be programmed only once.

RMA (Abbreviation) Return Merchandise Authorization Number

RT, Rt. or R. (Abbreviation) Right; ("**R**" at the end of Target Assy. Part N° signifies Target Insert is Reversed.)

RO (Abbreviation) Rollover (switches).

Saucer See Eject.

Scoop A hole into the playfield. A metal scoop is in place to guide the ball into the kick-back under the playfield.

Slam Tilt A switch which closes when the game is slammed into or the Coin Door is slammed shut. Depending on adjustable settings, will cancel game in play when the number of closures required is achieved.

SMB (Abbreviation) Shaker Motor Board.

Solenoid A coil used for Electro Magnetic devices such as relays, flippers, slingshots, etc.

SSFB (Abbreviation) Solid State Flipper Board.

STEP Refers to the service switches on the coin door.

Sub-Assy. (Abbreviation) Sub-Assembly.

S-U or S/U (Abbreviation) Stand-Up (targets).

TM (Abbreviation) Trademark

Transfer [Shot] Maneuvering the ball in play from one flipper to the other. With flipper in the up position and the ball cradled by that flipper one would activate the flipper button in a quick repetitive manner to bounce the ball to the other side. Skilled players can rebound the ball off the slingshot.

Tri-Ball Three balls in play.

TTL (Abbreviation) Transistor-Transistor Logic

Upr. (Abbreviation) Upper.

V or v (Abbreviation) Volt(s).

Ver. (Abbreviation) Version.

VUK (Acronym) **V**ertical **U**p-**K**icker (Super or Standard).

X (Abbreviation) "Times" A multiplier; also used in dimensions.

X-Ball An undetermined number of ball(s) during game play.

Zener Diode A semi-conductor diode used for voltage regulation. Application depends on reverse break-down voltage.

"-00B" "B" at the end of Coil Part Numbers signifies that the diode is attached to the bottom of the lug.

"-00T" "T" at the end of Coil Part Numbers signifies that the diode is attached to the top of the lug (the side nearest the coil-winding).

STERN™ PINBALL, INC. LIMITED WARRANTY

STERN PINBALL, INC., ("SELLER") WARRANTS ONLY TO THE INITIAL PURCHASER OF ITS PRODUCTS THAT THE ITEMS LISTED BELOW ARE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USE AND SERVICE FOR THE

PRINTED CIRCUIT BOARDS (GAME LOGIC):
DOT MATRIX DISPLAY BOARDS:

2 MONTHS
9 MONTHS

NO OTHER PARTS OF SELLER'S PRODUCT ARE WARRANTED.

WARRANTY PERIODS ARE EFFECTIVE FROM THE INITIAL DATE OF SHIPMENT FROM SELLER TO ITS AUTHORIZED DISTRIBUTORS.

SELLER'S SOLE LIABILITY SHALL BE, AT ITS OPTION, TO REPAIR OR REPLACE PRODUCTS WHICH ARE RETURNED TO SELLER DURING THE WARRANTY PERIODS SPECIFIED, PROVIDED:

1. SELLER IS NOTIFIED PROMPTLY UPON DISCOVERY BY PURCHASER THAT STATED PRODUCTS ARE DEFECTIVE.
2. SUCH PRODUCTS ARE PROPERLY PACKAGED AND THEN RETURNED FREIGHT PREPAID, TO SELLER'S PLANT.

THIS WARRANTY DOES NOT APPLY TO ANY PARTS DAMAGED DURING SHIPMENT AND/OR DUE TO IMPROPER HANDLING, OR DUE TO IMPROPER INSTALLATION OR USAGE, OR ALTERATION. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY ANTICIPATED PROFITS, LOSS OF PROFITS, LOSS OF USE, ACCIDENTAL OR CONSEQUENTIAL DAMAGES OR ANY OTHER LOSSES INCURRED BY THE CUSTOMER IN CONNECTION WITH THE PURCHASE OF A STERN PINBALL, INC. PRODUCT.

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CAUTIONS, WARNINGS & NOTICES

Caution



FOR SAFETY AND RELIABILITY, SUBSTITUTE PARTS AND EQUIPMENT MODIFICATIONS ARE NOT RECOMMENDED (AND MAY VOID ANY WARRANTIES). USE OF NON-STERN PINBALL INC. PARTS OR MODIFICATIONS OF GAME CIRCUITRY, MAY ADVERSELY AFFECT GAME PLAY, OR MAY CAUSE INJURIES. TRANSPORT PINBALL GAMES WITH HINGED BACKBOX IN THE DOWN POSITION ONLY! ALWAYS TAKE GREAT CARE WHEN SERVICING ANY GAME. ALWAYS READ THE SERVICE MANUAL BEFORE REPLACING OR SERVICING COMPONENTS. SUBSTITUTIONS OF PARTS OR EQUIPMENT MODIFICATIONS MAY VOID FCC TYPE ACCEPTANCE.



Always Disconnect The Line Voltage Before Servicing. Some Parts May Still Hold Current When Unplugged.

Warning



THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY, AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTIONS MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. IT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A COMPUTING DEVICE PURSUANT TO SUBPART J OF PART 15 OF FCC RULES, WHICH ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTERFERENCE WHEN OPERATED IN A COMMERCIAL ENVIRONMENT. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE INTERFERENCE IN WHICH CASE THE USER AT HIS OWN EXPENSE WILL BE REQUIRED TO TAKE WHATEVER MEASURES MAY BE REQUIRED TO CORRECT THE INTERFERENCE.

RF INTERFERENCE NOTICE, CABLE HARNESS PLACEMENTS AND GROUND STRAP ROUTING ON THIS GAME HAVE BEEN DESIGNED TO KEEP RF RADIATION AND CONDUCTION WITHIN LEVELS ACCEPTED BY THE FCC RULES. TO MAINTAIN THESE LEVELS, REPOSITION HARNESSES AND RECONNECT GROUND STRAPS TO THEIR ORIGINAL PLACEMENTS, IF THEY BECOME DISCONNECTED DURING MAINTENANCE.

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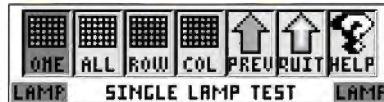
In SWITCH MENU
also select:

ACTIVE and
DEDICATED
SWITCH TESTS

SWITCH MATRIX GRID & DEDICATED SWITCHES

D iode O n T ermi n a l S t r i p :

Column (Drive)	1: Q1	2: Q2	3: Q3	4: Q4	5: Q5	6: Q6	7: Q7	8: Q8	GND	Ground
Row (Return)	GRN-BRN CN5-P1	GRN-RED CN5-P3	GRN-ORG CN5-P4	GRN-YEL CN5-P5	GRN-BLK CN5-P6	GRN-BLU CN5-P7	GRN-VIO CN5-P8	GRN-GRY CN5-P9	IC U206 INPUTS	BLK CN6-P1, -P11
1: U400	LEFT BUTTON (UK ONLY) on Cabinet side	SKILL SHOT Under Playfield	RIGHT RAMP ENTER On Ramp Assy.	POP BUMPER EXIT Under Playfield	SURPRISE PACKAGE TARGET On Assembly	LEFT RAMP ENTER On Ramp Assy.	LEFT BUMPER On Assembly	LEFT OUTLANE Under Playfield	1: U206 GRY-BRN CN6-P2	#1 LEFT FLIPPER BUTTON in Cabinet side
2: U400	4TH COIN SLOT On Coin Door	RIGHT ORBIT Under Playfield	RIGHT RAMP EXIT On Ramp Assy.	DROP TARGET On Assembly	GROTTO EJECT Under Playfield	LEFT RAMP EXIT On Ramp Assy.	RIGHT BUMPER On Assembly	LEFT RETURN LANE Under Playfield	2: U206 GRY-RED CN6-P3	#2 LEFT FLIPPER E.O.S (End-of-Stroke) in Cabinet side
3: U400	6TH COIN SLOT On Coin Door	4-BALL TROUGH #1 (LEFT) On Assembly	CENTER LANE Under Playfield	LEFT ORBIT Under Playfield	VUK On Assembly	CENTERFOLD 1 (CLOSED) On Assembly	BOTTOM BUMPER On Assembly	LEFT SLINGSHOT On Assembly	3: U206 GRY-ORG CN6-P4	#3 RIGHT FLIPPER BUTTON in Cabinet side
4: U400	RIGHT COIN SLOT On Coin Door	4-BALL TROUGH #2 On Assembly	NOT USED	NOT USED	NOT USED	CENTERFOLD 2 (OPEN) On Assembly	TEASE SCREW LIMIT On Assembly	RIGHT OUTLANE Under Playfield	4: U206 GRY-YEL CN6-P6	#4 RIGHT FLIPPER E.O.S (End-of-Stroke) in Cabinet side
5: U401	CENTER COIN SLOT / DBA On Coin Door	4-BALL TROUGH #3 On Assembly	CENTER RAMP EXIT On Ramp Assy.	TRIANGLE MECH 1 (RIGHT) On Assembly	NOT USED	NOT USED	TOURNAMENT BUTTON Cabinet Front	RIGHT RETURN LANE Under Playfield	5: U206 NOT USED GRY-GRN CN6-P7	#5 NOT USED
6: U401	LEFT COIN SLOT On Coin Door	4-BALL TROUGH VUK OPTO On Assembly	LEFT TOP LANE Under Playfield	TRIANGLE MECH 2 (LEFT) On Assembly	RAMP BALL LOCK 3 On Ramp Assy.	NOT USED	START BUTTON Cabinet Front	RIGHT SLINGSHOT On Assembly	6: U206 GRY-BLU CN6-P8	#6 VOLUME (RED BUTTON) (In Test: LEFT) on Coin Door
7: U401	5TH COIN SLOT On Coin Door	4-BALL STACKING OPTO On Assembly	MIDDLE TOP LANE Under Playfield	NOT USED	RAMP BALL LOCK 1 On Ramp Assy.	NOT USED	NOT USED	NOT USED	7: U206 GRY-VIO CN6-P9	#7 SERV. CRED. (GREEN BUTTON) (In Test: RIGHT) on Coin Door
8: U401	RIGHT BUTTON (UK ONLY) on Cabinet side	SHOOTER LANE Under Playfield	RIGHT TOP LANE Under Playfield	PEEK-A-BOO TARGET On Assembly	RAMP BALL LOCK 2 On Ramp Assy.	NOT USED	PLUMB BOB TILT Inside Cabinet	NOT USED	8: U206 GRY-BLK CN6-P10	#8 BEGIN TEST (BLACK BUTTON) (In Test: ENTER) on Coin Door



In LAMP MENU
also select:

TEST ALL LAMPS,
ROW & COLUMN
LAMP TESTS

LAMP MATRIX GRID

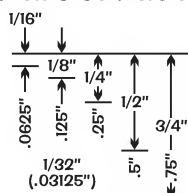
D iode O n T ermi n a l S t r i p :

Column (18v)	1: U17	2: U16	3: U15	4: U14	5: U13	6: U12	7: U11	8: U10
Row (GND)	YEL-BRN J13-P9	YEL-RED J13-P8	YEL-ORG J13-P7	YEL-BLK J13-P6	YEL-GRN J13-P5	YEL-BLU J13-P4	YEL-VIO J13-P3	YEL-GRY J13-P1
1: Q33	JANUARY #555 Bulb	FEBRUARY #555 Bulb	MARCH #555 Bulb	MANSION 1 (LT) #555 Bulb	MANSION 2 #555 Bulb	MANSION 3 #555 Bulb	MANSION 4 (RT) #44 Bulb	SHOOT AGAIN #555 Bulb
2: Q34	APRIL #555 Bulb	MAY #555 Bulb	JUNE #555 Bulb	LEFT OUTLANE #555 Bulb	LEFT RETURN LANE #555 Bulb	RIGHT RETURN LANE #555 Bulb	RIGHT OUTLANE #555 Bulb	PEEK-A-BOO #555 Bulb
3: Q35	JULY #555 Bulb	AUGUST #555 Bulb	SEPTEMBER #555 Bulb	PHOTO SHOOT (LT ORBIT) #555 Bulb	BUNNY (LT ORBIT) #555 Bulb	PHOTO SHOOT (LT RAMP) #555 Bulb	SPLASH (LT RAMP) #555 Bulb	JACKPOT (LT RAMP) #555 Bulb
4: Q36	OCTOBER #555 Bulb	NOVEMBER #555 Bulb	DECEMBER #555 Bulb	SURPRISE PACKAGE #555 Bulb	TEASE #555 Bulb	DROP TARGET #555 Bulb	MULTIBALL #555 Bulb	PAJAMA PARTY MULTIBALL #555 Bulb
5: Q37	BUNNY #1 (BOTTOM) #555 Bulb	BUNNY #2 #555 Bulb	BUNNY #3 #555 Bulb	BUNNY #4 #555 Bulb	BUNNY #5 #555 Bulb	BUNNY #10 #555 Bulb	NOT USED	LEFT TOP LANE #555 Bulb
6: Q38	MIDDLE TOP LANE #555 Bulb	RIGHT TOP LANE #555 Bulb	PHOTO SHOOT (CENTER) #555 Bulb	EXTRA BALL #555 Bulb	GROTTO ARROW #555 Bulb	PAJAMA PARTY HURRY-UP #555 Bulb	MYSTERY #555 Bulb	PHOTO SHOOT (RT RAMP) #555 Bulb
7: Q39	NOT USED	SPLASH (RT RAMP) #555 Bulb	PHOTO SHOOT (RT ORBIT) #555 Bulb	BUNNY (RT ORBIT) #555 Bulb	PHOTO SHOOT (VUK) #555 Bulb	JACKPOT HURRY-UP #555 Bulb	SPECIAL #555 Bulb	MAGAZINE 1 & 2 #555 Bulb
8: Q40	MAGAZINE 3 & 4 #555 Bulb	DOUBLE JACKPOT #555 Bulb	JACKPOT #555 Bulb	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
9: Q41	NOT USED	NOT USED	PEEK-A-BOO 1 & 2 #555 Bulb	PEEK-A-BOO 3 #555 Bulb	PEEK-A-BOO 4 #555 Bulb	CTRFOLD SPOTLITE (RT #1) #555 Bulb	CTRFOLD SPOTLITE (RT #2) #555 Bulb	START BUTTON #555 Bulb
10: Q42	CTRFOLD SPOTLITE (LT #2) #555 Bulb	STRIP POKER (LT RAMP) #555 Bulb	COLLECT PLAY-MATES #555 Bulb	CTRFOLD SPOTLITE (LT #1) #555 Bulb	CTRFOLD SPOTLITE (RT #3) #555 Bulb	LEFT BUMPER #555 Bulb	RIGHT & BOTTOM BUMPERS #555 Bulb	TOURNAMENT BUTTON #555 Bulb

PLAYBOY

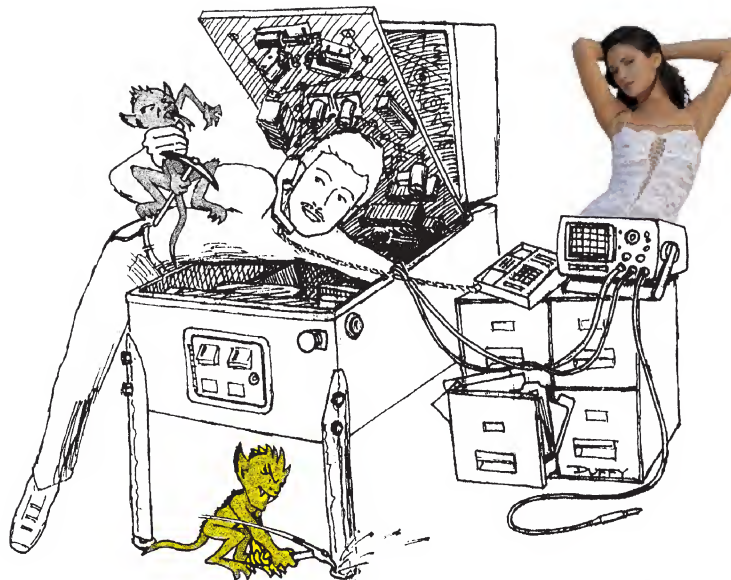
▼ U.S. ▼
Customary
Inch Ruler

Metric Conversion



1" = 2.54cm / 25.4mm
1cm = .3937"
1mm = .03937"

- For metric, multiply inch value by metric value, e.g. 5" X 2.54cm = 12.7cm or 127mm.
- For US, multiply metric value by inch value, e.g. 13cm X .3937" = 5.1181"



<http://www.SternPinball.com>

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